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The Resources Agency

DEPARTMENT OF WATER RESOURCES
Division of Operations and Maintenance

STATE WATER PROJECT ANNUAL REPORT OF OPERATIONS 1994

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Abbreviations and Units

The following names, terms, and units commonly used throughout this report are defined here and when first used in the text.

AF	acre-feet
Banks	Harvey O. Banks Delta Pumping Plant
California Aqueduct	Governor Edmund G. Brown California Aqueduct
CVP	Central Valley Project
cfs	cubic feet per second
D-1485	Water Rights Decision 1485
DFG	Department of Fish and Game
DOI	Delta Outflow Index
DPR	Department of Parks and Recreation
DWR	Department of Water Resources
DO	dissolved oxygen
EC	electrical conductivity
ft	feet
FRSA	Feather River Service Area
kv	kilovolt
kW	kilowatt
kWh	kilowatt-hour
LADWP	Los Angeles Department of Water and Power
MAF	million acre-feet
MW	megawatt
MWh	megawatt-hour
MWDSC	Metropolitan Water District of Southern California
µg/L	micro grams per liter
mg/L	milli grams per liter
mmhos/cm	milli mhos (Siemens) per centimeter
PGE	Pacific Gas and Electric Company
SCE	Southern California Edison
SDWA	South Delta Water Agency
SRI	Sacramento River Index
SWP	State Water Project
SWRCB	State Water Resources Control Board
USBR	United States Bureau of Reclamation

Introduction

The 1994 Annual Report of Operations for the State Water Project is divided into seven parts. The first two parts, "Highlights of 1994 Operation" and "Project Status in 1994," cover conditions and events of statewide significance. The following three sections cover water conditions, water operations, and energy operations in 1994. The sixth part, "Sacramento-San Joaquin Delta Operations," gives special emphasis to Delta operations, a key aspect of the SWP. The last part, "Project Operations by Field Division," provides details on operations and activities by field division as outlined on Map 2.

Highlights of 1994 Operation

Managing available water supplies during the recent drought required activities designed to make the most beneficial use of water available to SWP. Department of Water Resources initially structured its plan of operations according to the concept of a firm yield. Firm yield is the quantity of water that can be made available on a firm annual basis to water contractors during a drought period. In 1991 DWR changed its method of determining delivery amounts and replaced the concept of firm yield with the concept of variable yield. Operating on the basis of a variable yield makes efficient use of available water supplies during a drought. DWR also developed programs to compensate for limited storage facilities. Those programs include water transfers, exchanges, loans, storage, purchases, and carry-over for delivery at a later date. The 1993/94 water year was declared a critically dry year (7.8 MAF) that required shortages in deliveries.

Total original requests for entitlement water were about 3.85 MAF. Because 1994 was so dry, the Department adjusted the request to about 3.12 MAF based on maximum entitlement used by each contractor since 1980 and approved 50 percent of the adjusted request for delivery, 1.56 MAF, for municipal and industrial uses, and 0% for agricultural uses. On February 2, 1994, the Department increased the amount of entitlement water approved for delivery to 2.03 MAF, based on 50 percent of 1994 Table A entitlements. On April 13, the Department announced the final approval of 1.91 MAF.

Programs permitting agencies to exchange, loan, store, and purchase water from the SWP allowed contractors to pump water directly into the California Aqueduct. To preserve water quality, DWR normally does not allow water to be pumped directly into the aqueduct. But because of the seven years of drought, only one wet year, and the return a critically dry year, DWR approved the pump-ins after implementing a

comprehensive program to check and monitor the quality of water introduced into the aqueduct. Pump-in agreement details are discussed further in this report under "*Water Deliveries and Aqueduct Operations*".

DWR and USBR declared balanced Delta water conditions during 1994 from April 6 to December 8. This was the eleventh consecutive year in which balanced water conditions were declared.

The SWP depends on a complex system of dams, reservoirs, power plants, pumping plants, canals, and aqueducts to deliver water. Although initial transportation facilities were essentially completed in 1973, other facilities have been constructed since then, and still others are under construction or are scheduled to be built as needed. The SWP facilities now comprise 27 dams and reservoirs, 25 pumping and generating plants, and nearly 600 miles of aqueducts.

Energy resources totaled 7,714,804 MWh which includes generation of 4,871,215 MWh of energy at SWP locations, purchases of 773,592 MWh, other resources of 260,392 MWh, 1,790,644 MWh of SCE return additional, and 18,961 MWh of deviation adjustment (see Figure 4). Energy loads of 7,714,804 MWh include sales of 2,161,155 MWh, 5,315,480 MWh used to deliver water to SWP contractors, 233,450 MWh of losses, and 4,719 MWh of deviation (see Figure 6).

SWP facilities delivered 3,859,401 AF of water to 25 long-term contractors and 25 other agencies in 1994 as shown on Table 2. This amount is approximately 630 TAF less than the total State and federal water deliveries from the SWP in 1993. State contractor deliveries were 1,975,016 AF; including 1,856,751 AF of entitlement water and 118,256 AF of other water; excluding Joint Facilities and prior water right deliveries. See the "*Water Deliveries and Aqueduct Operations*" section for more details on water deliveries.

Project Status in 1994

Project Facilities

The SWP conserves water for distribution to much of California's population and to irrigated agriculture. It also provides flood control, water quality control, electrical power generation, recreational opportunities, and enhancement of sport fisheries and wildlife habitat.

SWP facilities in operation during 1994 included: 27 water storage facilities, 3 pumping-generating plants, 5 power plants, 14 pumping plants, and nearly 600 miles of aqueduct

The SWP begins with three small lakes on the Feather River tributaries: Lake Davis, Frenchman Lake, and Antelope Lake. The branches and forks of the Feather River flow into Lake Oroville, SWP's principal reservoir with a capacity of about 3.5 MAF. From Oroville, water flows through a complex system of three hydroelectric powerplants, then down the Feather River into the Sacramento River before reaching the Delta. From the northern Delta, water is supplied to Napa and Solano counties through the North Bay Aqueduct.

Near Byron, in the southern Delta, the SWP diverts water into Clifton Court Forebay for delivery south of the Delta. The Banks Pumping Plant lifts water into Bethany Reservoir. It is then lifted by the South Bay Pumping Plant into the South Bay Aqueduct. Through the South Bay Aqueduct water is supplied to Alameda and Santa Clara Counties. Most of the water from the Bethany Reservoir, however, flows into the Governor Edmund G. Brown California Aqueduct. At O'Neill Forebay, part of the water is pumped through the Gianelli Pumping-Generating Plant for storage in San Luis Reservoir until needed. DWR's share of storage in the reservoir is 1,062,183 AF of water.

Water not stored in San Luis Reservoir continues its flow south down the valley and is raised 1,069 ft by four pumping plants: Dos Amigos, Buena Vista, Teerink, and Chrisman. In the southern San Joaquin Valley, the Coastal Branch Aqueduct serves agricultural areas west of the California Aqueduct. At the Tehachapi Mountains, Edmonston Pumping Plant raises the water 1,926 ft and the water enters 8.5 miles of tunnels and siphons. Once the water has crossed the Tehachapi Mountains, it flows through the California Aqueduct into the Antelope Valley. The California Aqueduct then divides into two branches, the East Branch and West Branch.

The East Branch carries water through the Antelope Valley into Silverwood Lake. From Silverwood Lake, the water enters the San Bernardino Tunnel and

drops 1,418 ft into Devil Canyon Powerplant, then flows to Lake Perris, SWP's southernmost reservoir.

Water in the West Branch flows through Warne Powerplant into Pyramid Lake. From Pyramid Lake the water flows through the Angeles Tunnel and Castaic Powerplant into Castaic Lake, terminus of the West Branch. For the location of facilities cited here, see Map 1.

SWP facilities include 27 dams and reservoirs. Lake Oroville and San Luis Reservoir are the primary conservation facilities. The remaining 25 dams and reservoirs are used principally to regulate the conserved supply into water delivery patterns designed to fit local needs. Of those 25 the five largest are Lake Del Valle, located in Alameda County; and Pyramid Lake, Castaic Lake, Silverwood Lake, and Lake Perris, in Southern California. Lake Del Valle is approximately four miles from the city of Livermore. The four southern reservoirs-Pyramid Lake, Castaic Lake, Silverwood Lake, and Lake Perris-are near the metropolitan areas of southern California, where water supplies are mainly imported. Information about these reservoirs, including amounts of unimpaired runoff to Lake Oroville and storage levels for SWP's conservation, and other storage facilities are summarized in this report.

Outages and Limitations

Major outages, construction, and operating limitations of SWP facilities during 1994 were:

January

- Badger Hill Pumping Plant, Unit 1 was out of service from January 20 to February 18 for annual mechanical and preventive maintenance.
- Banks Pumping Plant, #2 penstock and Units 4 and 5 were out of service from January 3 to January 21 to remove, repair, and reinstall Unit 4 discharge valve and repack Unit 4 pump.
- Devil Canyon Powerplant, Unit 2 out of service from January 31 to June 29 for annual preventive maintenance.
- Hyatt Powerplant, Unit 6 out of service from January 3 to January 21 for annual preventive maintenance and repair of an oil leak and Unit 2 out of service from January 28 to February 18 for annual maintenance.
- Las Perillas Pumping Plant, Unit 3 out of service from January 1 to January 10 for annual maintenance.

- Pearblossom Pumping Plant, Unit 8 out of service from January 20 to February 8 for efficiency testing.
- Pine Flat Power Plant, Unit 1 out of service from January 3 to January 28 for annual maintenance.
- South Bay Pumping Plant, Unit 5 out of service from January 10 to January 17 for annual maintenance, and Unit 1 out of service from January 18 to January 27 for annual maintenance.
- Thermalito Pumping-Generating Plant, Unit 1 out of service from January 20 to March 4 for annual maintenance and to replace blade trunnion seal.

February

- Badger Hill Pumping Plant, Unit 2 out of service from February 16 to March 23 for annual mechanical maintenance.
- Devil Canyon Powerplant, Unit 2 out of service from February 22 to June 29 to repair turbine shutoff valve.
- Hyatt Powerplant, Unit 3 out of service from February 22 to April 15 for annual maintenance and replacement of downstream seat O rings on the turbine shutoff valve.

March

- Badger Hill Pumping Plant, Unit 3 out of service from March 23 to April 20 for annual maintenance.
- Dos Amigos Pumping Plant, Unit 2 out of service from March 31 to September 30 for overhaul.
- Gianelli Pumping-generating Plant, Unit 2 out of service from March 16 to March 31 to complete overhaul and Unit 8 out of service from March 16 to April 1 to complete overhaul.
- Pearblossom Pumping Plant, Unit 8 out of service from March 9 to April 11 to repair leak in discharge valve and to paint motor housing.
- Thermalito Pumping-Generating Plant, Unit 2 out of service from March 15 to April 8 for annual maintenance.

April

- Banks Pumping Plant, Units 10 and 11 out of service from April 10 to April 26 to repair Unit 11 discharge valve trunnion.
- California Aqueduct, Check 34 out of service from April 7 to June 10 to install new sacrificial anodes. Check 55 out of service from April 18 to May 20 to recoat gates.

- Pearblossom Pumping Plant, Unit 4 out of service from April 25 to June 30 for warranty inspection. Unit 6 out of service from April 30 to May 7 for annual maintenance. Unit 9 out of service from April 25 to May 9 to paint stator area.
- Reid Gardner Powerplant, Unit 4 out of service from April 30 to May 27 for annual maintenance.
- Teerink Pumping Plant, Unit 5 out of service from April 1 to November 11 to replace impeller.
- Thermalito Pumping-Generating Plant, Unit 3 out of service from April 12 to May 6 for annual maintenance.
- Warne Pumping Plant, Unit 1 out of service from April 4 to April 15 for annual maintenance. Unit 2 out of service from April 18 to April 29 for annual maintenance.

May

- Devil Canyon Powerplant, Units 1 and 2 out of service from May 10 to May 27 to install turbine shutoff valve on Unit 2. Unit 3 out of service from May 23 to June 17 for annual maintenance.

June

- California Aqueduct, Checks 14 and 15 out of service from June 10 to September 15 to recoat the gates. Check 31 out of service from June 27 to August 8 to recoat the gates. Check 53 out of service from June 2 to August 8 to recoat the gates and install cathodic protection.

July

- Banks Pumping Plant, Unit 2 out of service from July 20 to August 12 for stator measurement.
- Devil Canyon Powerplant, Unit 4 out of service from July 19 to August 8 for annual maintenance.

August

- California Aqueduct, Check 51 out of service from August 30 to November 4 to recoat the gates.

September

- Buena Vista Pumping Plant, Unit 2 out of service from September 7 to September 30 for annual maintenance and to replace the impeller.
- Dos Amigos Pumping Plant, Unit 2 out of service from September 7 to September 30 for biennial maintenance.
- Gianelli Pumping-Generating Plant, Units 5 and 6 out of service from September 6 to September 14 for biennial inspection.

- South Bay Pumping Plant, Units 1 and 8 out of service from September 26 to November 1 to replace pumps and motors.

October

- Badger Hill Pumping Plant, Unit 6 out of service from October 14 to January 27, 1995 end for annual maintenance.
- Chrisman Pumping Plant, Units 1, 2, and 3 out of service from October 21 to November 1 to repair dresser coupling packing on the discharge line.
- California Aqueduct, Check 22 out of service from October 27 to November 30 to install sacrificial anodes.
- Dos Amigos Pumping Plant, Unit 5 out of service from October 17 to November 11 for biennial inspection and maintenance.
- Pine Flat Powerplant, Units 1, 2, and 3 out of service from October 28 to December 9 for annual maintenance and Doble testing.
- Hyatt Powerplant, Unit 1 out of service from October 27 to November 22 for annual maintenance. Unit 4 out of service from October 3 to October 26 for annual maintenance.
- Thermalito Pumping-Generating Plant, Unit 2 out of service from October 3 to January 25, 1995 for annual maintenance and to realign shaft and stator.
- Warne Pumping Plant, Unit 2 out of service from October 3 to January 21, 1995 for annual maintenance and relay trip testing.

November

- Banks Pumping Plant, Units 8 and 9 out of service from November 28 to December 9 to relabel wiring in the exciter cubicle.

- Devil Canyon Powerplant, Unit 2 out of service from November 28 to March 2, 1995 for annual electrical and mechanical maintenance.
- Dos Amigos Pumping Plant, Unit 1 out of service from November 15 to April 14, 1995 for biennial inspection and maintenance.
- Edmonston Pumping Plant, East discharge line out of service from November 28 to December 23 for inspection and to replace downstream seat O ring on Unit 7.
- Hyatt Powerplant, Unit 6 out of service from November 28 to December 21 for annual maintenance.

December

- Banks Pumping Plant, Units 10 and 11 out of service from December 12 to December 28 to relabel wiring in the exciter cubicle.
- California Aqueduct, Pool 6 out of service from December 1 to December 16 for cleaning.
- Hyatt Powerplant, Unit 5 out of service from December 27 to January 18, 1995 for annual maintenance
- Las Perillas Pumping Plant, Unit 6 out of service from December 13 to January 20, 1995 for annual maintenance.
- Oso Pumping Plant, Unit 3 out of service from December 16 to February 15, 1995 for annual electrical maintenance and to overhaul the discharge valve.
- Pearblossom Pumping Plant, Unit 2 out of service from December 19 to December 30 for annual maintenance.
- Warne Pumping Plant, Unit 1 out of service from December 6 to December 16 to install secondary knife disconnects.

Water Supply Conditions

The SWP monitors precipitation and calculates runoff to coordinate the operation of Oroville Reservoir with the complex system of other dams and reservoirs. Information on those activities is based on the water supply conditions of the 1994 calendar year and the 1993-94 water year.

In a typical year, California receives approximately 193 MAF of precipitation as rain or snow. Of this amount, about 107 MAF falls in northern California. However, about 75 percent of the demand for water originates in highly populated southern California. About 30 MAF runs off into streams or rivers and eventually flows into the Sacramento-San Joaquin Delta, the primary source of SWP's water supply.

Precipitation statewide was about 65 percent of average during water year 1993-94, compared with 140 percent in the previous year. There was little variation among hydrologic regions; all regions were quite dry.

The 1993-94 water year started out poorly, with California having received only about 55 percent of average rainfall by February 1. Precipitation for the month of February was just slightly above average statewide at 105 percent, which slightly improved the outlook for the year. However, March was very dry, especially in the northern Sierra Nevada. Consequently, the dry water year deteriorated into a critical water year. Spring showers in April and May were somewhat less than average and failed to improve the State's water outlook.

Statewide runoff was 40 percent of average for water year 1993-94, much less than the 125 percent reported in 1993. The year started dry, with cumu-

lative runoff for the 3 months October through December measuring 36 percent of average as of January 1. January runoff was only about 30 percent of average. Runoff in subsequent months generally ranged from 40 to 50 percent of average, except for June and July, when poor snowpack provided only 40 percent of the average runoff. The estimated runoff for April through July was 42 percent of average, close to the 40 percent figure for the entire water year.

Total runoff in the Sacramento River Basin in northern California has been as little as 5.1 MAF in 1977, and as much as 38 MAF in 1983 (the 50-year average is about 18 MAF). This runoff constitutes the primary SWP water supply.

The SRI unimpaired runoff was only 7.8 MAF, down greatly from the 22.2 MAF of water year 1993. That amount of runoff classified the water year as "critical" under the SWRCB Decision 1485.

As in the previous year, runoff in fall 1994 remained below average and was less than 50 percent of average at the end of December 1994. However, precipitation in the northern Sierra was 95 percent of average and the snowpack was near normal for the date, giving the State a much better outlook for the coming 1995 year.

By the end of the 1993-94 water year, storage at major in-state reservoirs was 16 MAF, about 75 percent of average but only two thirds as much as the 24 MAF (110 percent of average) in storage on September 30, 1993.

Water Operations

Reservoir Operations

Lake Oroville and San Luis Reservoir are the two conservation facilities for SWP water supplies. Table 8 and Table 13 summarize the operations of these reservoirs during the 1994 calendar year.

Lake Oroville began 1994 with 2,429,938 AF of storage, 156,667 AF more than it held at the beginning of 1993. Computed inflow peaked in March. Storage in Lake Oroville peaked on April 17, 1994 at 2,661,421 AF (75 percent of normal maximum operating capacity) and dropped to 1,668,244 AF (47 percent of normal maximum operating capacity) by December 31 (see Table 8). The net effect of operations and water conditions at Lake Oroville resulted in a storage reduction of 761,694 AF.

At the beginning of 1994, Lake Del Valle held 24,926 AF (62 percent of normal maximum operating

capacity). Almost all of Lake Del Valle's natural inflow for the year, 3,140 AF, occurred in the months of January, through May (see Table 11).

At the start of 1994, San Luis Reservoir held 1,985,549 AF, 98 percent of its normal maximum operating capacity (2,027,835 AF); the SWP share held 1,062,560 AF of its maximum operating capacity (1,062,183 AF). Maximum storage in 1994 was 2,033,684 AF on March 11, over 100 percent of normal maximum operating capacity. Storage receded to a minimum of 262,340 AF on August 23, only 13 percent of normal maximum operating capacity. SWP storage at the end of 1994 increased to 694,184 AF. End-of-year federal storage was 502,391 AF, for year-end total of 1,196,575 AF.

SWP southern reservoirs (Pyramid, Castaic, Silverwood, and Perris) have a combined maximum op-

erating storage capacity of 701,320 AF. At the beginning of 1994, the combined storage was 565,372 AF and decreased to 486,116 AF by the end of 1994.

The following tabulation compares normal operating capacity in the principal SWP reservoirs with end-of-year storage for 1993 and 1994 and clearly shows the effect of the critically dry year:

Reservoir	Normal Maximum Operating Capacity	End-of-year Storage 1993	End-of-year Storage 1994
Lake Oroville	3,537,580	2,429,938	1,668,244
Lake Del Valle	40,000	24,926	25,737
San Luis Reservoir	1,062,183	1,062,560	694,184
Pyramid Lake	171,200	160,299	159,505
Silverwood Lake	74,970	58,730	69,932
Lake Perris	131,450	120,597	109,552
Castaic Lake	323,700	225,746	147,127
Totals	5,341,083	4,082,796	2,874,281

Water Deliveries and Aqueduct Operations

Generally, water diverted from the Sacramento-San Joaquin Delta is delivered to SWP storage facilities and to contractors through Harvey O. Banks Delta Pumping Plant or Barker Slough Pumping Plant, for a variety of beneficial uses. In addition to delivering entitlement water to long-term water supply contractors, the SWP transports water to other public agencies through exchanges or purchases; provides water for wildlife and recreational uses; and conveys water to meet local water rights agreements. Specific information about water deliveries made to long-term contractors and other agencies during 1994, and from 1962 through 1994, has been organized in Table 2.

Make-up water is allocated to contractors according to Article 12(d) and Article 14(b) of the long-term water supply contracts. According to Article 12(d), if for some reason beyond DWR's control, water is not available for delivery according to the established schedule for that year, the water may be delivered at a later date. Article 14(b) of the long-term water supply contracts provides for the delivery of water at a later time if water is not delivered due to necessary investigations, inspections, maintenance, repairs, or replacement of SWP facilities. There were 25,400 AF of make-up water as defined by Article 12(d) or Article 14(b) delivered to three long-term contractors in 1994. Napa County Flood Control and Water Conservation District received 400 AF, Mojave Water Agency received 5,000 AF, and Metropolitan Water District of Southern California received 20,000 AF.

Under provisions of their water supply contracts, South Bay and San Joaquin Valley contractors may reduce entitlement water deliveries during years in which above-average amounts of local water are available and increase deliveries by an equal amount in later years. No additional credits for wet-weather water were acquired during 1994.

The Department and SWP water contractors reached an understanding called the Monterey Agreement on December 1, 1994. This agreement established the Monterey Principles for amending the Department's SWP water contracts with long-term water contractors.

The Monterey Agreement grew out of water allocation concerns that intensified during the 1987-1992 drought. Rather than negotiate only water allocation issues, the Department and water contractors decided on a major revision to SWP long-term contracts and their administration—in essence, to update management of the SWP. The Monterey Agreement was released to the public December 16, 1994, in the form of 14 principles. *Bulletin 132-95, Chapter 1*, explains the Monterey Agreement in detail.

For several years, DWR has offered contractors the opportunity to carry over for delivery during the next year a portion of their entitlement water approved for delivery in the current year. The carry-over program was designed to encourage the most effective use of water, and to avoid obligating the contractors to use or lose the water by December 31. Because operational constraints may change from year to year, an agreement in which the conditions of the approval are listed is signed each year with participating contractors. No entitlement water was carried over from 1993 into 1994.

The Department approved 55,810 AF of 1994 carryover water for delivery to five contractors in 1995. The 827 AF of 1994 entitlement water approved for delivery to Empire West Side Irrigation District in 1995 was previously classified as wet-weather water as defined in a letter agreement dated October 1, 1979.

During 1994, SWP provided water service to 50 agencies, including 25 long-term water contractors as listed in Table 2. SWP facilities were used to convey non-project water for other agencies, including the CVP. In addition, SWP facilities were used to deliver water transfers, water purchased from the Drought Water Bank, and transfers from one agency to another. Transfers were accomplished according to agreements negotiated with USBR throughout the year and with participants of existing three-party contracts for the use of the Cross Valley Canal, a water conveyance facility that connects with the California Aqueduct in Kern County.

Total Project (State and federal) deliveries for 1994 totaled 3,859,401 AF. This total includes State contract deliveries of 1,975,016 AF, federal deliveries of 1,009,315 AF, Oroville Complex diversions of 862,779 AF, and Upper Feather River deliveries of 1,052 AF. State contract deliveries included a total of 1,856,751 AF of entitlement and entitlement-related water to the 25 long-term contractors, plus 118,265 AF of other water. A graph showing the historical trend of annual total deliveries from SWP facilities is shown in Figure 1. Amounts of 1994 water deliveries are shown by field division on Map 2, and include entitlement water, 1994 Drought Bank water, permit water, local supply, recreation, purchases, wheeling, and water transfers. Totals by agency are shown in Table 2.

In 1994, DWR implemented a drought water bank program similar to the successful 1991 and 1992 drought water bank programs. DWR conveyed a total of 25,968 AF of drought bank water to four long-term contractors and 76,440 AF to three non-SWP contractors in 1994.

The following table is a summary of long-term contract deliveries in 1994 in acre-feet:

Entitlement Water		Other Water	
M & I	926,573	Exchange	9,262
Agricultural	610,533	General Wheeling	2,000
Ground Water	123,470	Local Supply	3,676
Bypass	74,393	Recreation	3,803
Interruptible	112,625	1994 Purchase	58,400
City of Benecia	6,576	Vallejo Permit	5,734
City of Vallejo	2,581	Transfer	5,025
		1994 Water Bank	25,968
		Salinity Control	4,397
Total	1,856,751	Total	118,265
Total Water		1,975,016	

Significant Operational Activities

January

- The Delta cross-channel gates, owned and operated by the USBR, were closed on January 8 to provide additional protection against the movement of early arriving winter-run salmon smolt out-migrants into the interior Delta. The gates had been open since November 7, 1993.
- On January 17, 1994, a 6.6 earthquake occurred near Northridge, in the San Fernando Valley. SWP facilities sustained only minor damage due to the quake but operations of West Branch facilities were disrupted due to problems in the

electrical transmission system in southern California.

- On January 26, 1994, SWP began delivery of interruptible 1994 entitlement water to those contractors who could use additional early deliveries.

February

- The Santa Ana Valley pipeline was dewatered on January 31, 1994, for installation of a regulating valve, construction of the wye section connecting the new Devil Canyon Afterbay to the existing Santa Ana Valley pipeline, and installation of a bumped head/roll-out assembly in the pipeline at Sugar Loaf Mountain. Normal operation resumed on March 3, 1994.
- Earthquake aftershocks continued throughout the month of February in Southern California. At least 20 inspections were made after the January 17 quake but no problems were discovered.
- There was some salvage of winter-run size Chinook salmon at the SWP and CVP fish recovery facilities. Incidental take 157 as of February 28, 1994. This is 17 percent of the 906 allowed incidental take between October 1993 and May 1994.

March

- DFG reports that all clipped winter-run size salmon that have been caught at the State and Federal fish facilities through March 28, 1994, have been determined not to be winter-run salmon.
- Delta smelt were observed in Barker Slough, which limited North Bay Aqueduct diversions to 65 cfs average to protect the smelt.
- A bulkhead was installed in the Santa Ana Pipeline at Sugar Loaf Mountain to allow pump back from Lake Perris to Metropolitan Water District's Mills Treatment Plant during the outage that was required to connect the second Devil Canyon Afterbay to the pipeline.
- Deliveries from Castaic Lake to Metropolitan Water District's Jensen Treatment Plant were interrupted while their Foothill Feeder was being repaired.

April

- An earthquake of magnitude 4.7 was reported on April 21, 12 miles north of Coalinga. No damage to Project facilities was found.
- California Aqueduct pools 1, 2, and 3, which had been lowered to allow leak repairs and liner panel replacement at several locations were refilled and placed back in operation.

May

- The very dry winter coupled with severe restrictions on pumping in the Delta resulted in major cutbacks in water deliveries to SWP and Central Valley Project contractors
- DWR had a rock barrier installed at the head of Old River on April 24 to facilitate seaward migration of Chinook salmon smolts on the San Joaquin River system. After installation, Delta smelt take increased; thus, prompting USFWS to request removal of the barrier. The barrier was breached on May 18; however, no significant reductions in Delta smelt take occurred.
- Delta exports were reduced in April and remained at near minimum levels through May. Initially, pumping was reduced to avoid take of winter-run salmon, but by the middle of May, Delta smelt take was restricting exports

June

- Monitoring in the south delta channels was done at a low export rate of about 2,000 cfs and a moderate rate of 6,000 cfs to determine if the density or relative distribution of Delta smelt would change with the export rate. The preliminary results indicated that the change in export rate did not impact the density or distribution of Delta smelt.

July

- Operations in the Delta in July were controlled by D-1485 water quality criteria. Pumping schedules and monitoring programs were adjusted in July to provide information on the relationship between Delta smelt distribution and SWP/CVP export rates.

August

- Runoff during the summer months was about one-third of average due to the meager spring snow-pack.

September

- Releases from Cordelia Forebay, on the North Bay Aqueduct, into Green Valley Creek were initiated on September 1. These releases were made as a part of a test to evaluate the feasibility of using North Bay Aqueduct to provide salinity control in the western Suisun Marsh.

- Pine Flat Powerplant generation was terminated on September 1, due to the low storage level in Pine Flat Reservoir.

October

- A leak in the South Bay Aqueduct at Mile 31.61 occurred on October 9. Repairs were completed on October 12 and the pipeline returned to service on October 14.

November

- The pumps at the Tupman Turnout which move water from Kern County Water Agency's Cross Valley Canal into the California Aqueduct were reinstalled. The pumps allowed extraction of up to 6,000 acre-feet of 1987 Advance Storage Program and 1990 Berrenda Mesa Program ground water in addition to the amount which is used locally.
- The final phase of the Suisun Marsh special salmon migration study was completed on November 14. The stoplogs were installed at the Montezuma Slough Salinity Control Structure and gate operation was initiated. Flow augmentation of Green Valley Creek from the North Bay Aqueduct was terminated also on that day as a condition of consultation with fishery agencies on the Western Marsh Salinity Control Test.
- The final installment of 3,222 AF was exchanged to the USBR in O'Neill Forebay on November 4. The USBR had exchanged 134,722 AF to DWR during the spring and summer as compensation for inequities in Delta exports caused by endangered species operations. The return of the exchange water to USBR eliminated any power inequities.
- Drawdown of Castaic Lake and Elderberry Forebay continued during the month. A variety of repairs, including dredging of Elderberry Forebay, repairs to Castaic Plant, repairs to rip-rap on the face of Elderberry Dam, and repairs to the outlet tower in Castaic Lake were scheduled.

December

- The West Branch facilities, from Pyramid Lake through Elderberry Forebay, were shut down on December 6 for repairs to Castaic Power Plant and Elderberry Forebay Dam. During this outage DWR inspected the Angeles Tunnel and conducted a monument survey inside the Peace Valley Pipeline to monitor for movement.

Energy Operations

Energy Sources

Energy generation from SWP's seven hydroelectric plants (Hyatt, Thermalito, Gianelli, Warne, Castaic, Alamo, and Devil Canyon) during 1994 totaled 2,825,175 MWh, as illustrated in Figure 3.

The SWP receives energy under contract from five small hydroelectric facilities (total capacity of 30 MW) owned and operated by MWDSC. In 1994, these plants furnished 213,396 MWh of energy to the SWP. DWR has exchange arrangements with Southern California Edison and the Los Angeles Department of Water and Power to provide transmission of this energy.

The DWR-SCE Power Contract has been in effect since April 1983. Under this contract, part of the Hyatt Thermalito Power plants' generation and all of the output of Devil Canyon Power Plant and Alamo Power Plant are delivered to SCE. The energy is generally delivered during on-peak periods and a greater amount of energy is returned during off-peak periods. SCE combined return and additional to the SWP during 1994 was 1,790,644 MWh.

Long term contracted energy purchases, such as Tera Corp. and MWD Hydro, are itemized separately in Table 3. Other purchases totaled 773,592 MWh from various utilities, such as Pacific Power and Light and Salt River Project.

Energy Loads

Energy load data (total energy used by the SWP) is summarized in Table 4, and Figures 5 and 6. For the purposes of balancing energy resources and loads, this report itemizes those amounts required to meet SWP supplies and demands separately from those amounts required to meet total DWR supplies and demands. Besides Project energy loads of 5,315,480 MWh, total DWR energy loads include sales of 2,161,155 MWh, losses of 233,450 MWh, and deviation adjustments of 4,719 MWh.

The San Joaquin Field Division accounted for over half of the total project energy load. The Edmonston Pumping Plant used 2,063,516 MWh with peak pumping occurring in July. Project energy loads also include amounts that DWR is committed to supplying to agencies such as SCE, LADWP, PG& E, and the Bonneville Power Authority.

In 1994, the Department had contracts with 30 utilities for the sale of excess power. The Department sold power to 23 of these agencies, resulting in revenues of over \$52 million. The largest sale was 611,332 MWh to Sacramento Municipal Utility District.

Sacramento - San Joaquin Delta Operations

The Sacramento-San Joaquin Delta provides an estimated one-half of the State's water supply. In addition, the Delta is an estuary, a constantly changing area where tidal and river currents meet, and where salinity is between the extremes of brackish and fresh waters. The estuary provides habitat for fish and wildlife, including waterfowl on the Pacific Flyway.

Many of the problems facing the Delta today, such as saltwater intrusion and oxidation of peat soil, have plagued the area for many years. Originally a tidal marshland covered with tules, the Delta, during dry summer months, has been subject to intrusions of salty ocean water from the San Francisco Bay.

Today, dams upstream of the Delta, including SWP's Oroville Dam and CVP's Shasta Dam, help control the intrusion of salt water by releasing fresh water into the Delta during dry periods in summertime. However, problems with salinity in the Delta still exist.

With assistance from urban, agricultural, and environmental interests, and other stake-holders concerned with Bay-Delta issues, State and federal agencies developed the Bay Delta Accord. The Accord grew out of Governor Wilson's 1992 policy to "fix the Delta." This led to events that shaped the State-Federal Framework Agreement, signed in June 1994, and the Bay-Delta Accord signed December 15, 1994. *Bulletin 132-95, Chapter 1*, explains both the State-Federal Framework Agreement and the Bay-Delta Accord in detail.

Pumping at Banks Pumping Plant was voluntarily halted from March 30 through April 3 and resumed at a reduced pumping rate of approximately 375 cfs to meet South Bay Aqueduct demands from April 4 through May 23. This action was taken to decrease the "take" of endangered winter-run Chinook salmon, which was approaching allowable limits established by the National Marine Fisheries Service.

Banks Pumping Plant reduced pumping to South Bay Aqueduct demand levels once again between May 31 and July 6 because of the presence of increasing numbers of threatened delta smelt. In late May SWP and CVP had exceeded "take" levels for delta smelt

established by the United States Fish and Wildlife Service.

Delta Outflow Index

Direct measurements of net Delta outflow are impractical because of huge tidal flows. However, since net outflow is one of the primary factors in controlling Delta water quality, a calculated index known as the DOI has been developed. The DOI represents the daily mean net flow of Delta water into Suisun Bay. Table 5 shows the daily DOI for 1994.

Several surface inflows--notably the Cosumnes, Mokelumne, and Calaveras rivers, and the Yolo Bypass flood control channel--are not included in DOI calculations. Furthermore, the channel depletion factors in the calculation are based on daily increments of long-term averages, whereas Delta inflow estimates represent mean flows for that day. A comparison of Delta Inflow and DOI is plotted on Figure 7. Gross channel depletion is the sum of evapotranspiration and net increase in soil moisture of Delta lands plus evaporation from Delta channels.

The DOI is calculated daily from the sum of Sacramento River inflow, San Joaquin River inflow, and Sacramento Treatment Plant discharge minus the Delta consumptive use estimates and the water exported by the SWP, CVP, and Contra Costa Canal. The Delta consumptive use variable used in the DOI calculation is based on daily increments of long-term averages. Daily inflow estimates are based on either the daily mean of hourly measurements or on an instantaneous flow measurement that represents the entire day.

The 1994 daily DOI averaged 7,122 cfs for the year and was 15,165 cfs less than the 1993 daily average. The greatest mean monthly DOI occurred in February, at 17,042 cfs and the greatest mean daily was 29,512 cfs on December 7. The lowest monthly DOI occurred in September (2,463 cfs) and the year's lowest daily DOI was on September 24 with an index of only 550 cfs.

D-1485 standards set a minimum DOI at Chipps Island for adequate water for fisheries. All DOI and river flow standards were met in 1994.

Project Operations by Field Division

Oroville Field Division

Water Storage

SWP water storage facilities in the Oroville Field Division include Lake Oroville, Thermalito Forebay and Afterbay (Oroville-Thermalito Complex) and upper Feather River reservoirs consisting of Lake Davis, Frenchman Lake, and Antelope Lake. Lake Oroville operations store winter and spring runoff for later SWP use for power generation, flood control, recreation, fish and wildlife enhancement, in addition to water supply.

The Upper Feather River Reservoirs have a combined capacity of 162,000 AF. Monthly operations for the three Upper Feather River reservoirs are presented in Table 7. The table below compares storage capacity with the largest end-of-month storage for each reservoir for the last five years:

Year	Reservoir (Capacity)		
	Antelope 22,566	Frenchman 55,477	Davis 84,371
1994	(May) 19,686	(Mar) 32,770	(Apr) 63,089
1993	(Apr) 23,895	(May) 39,814	(Jun) 68,908
1992	(Apr) 17,596	(Feb) 15,580	(Mar) 40,008
1991	(May) 22,048	(Apr) 22,590	(Apr) 48,902
1990	(May) 22,007	(Apr) 28,207	(Apr) 55,713

The total amount of unimpaired runoff to Lake Oroville for the 1993-94 water year totaled about 1.86 MAF, 41 percent of average. Lake Oroville storage on January 1, 1994 was 2,429,938 AF. Storage peaked on April 17, 1994, at 2,661,421 AF, 75 percent of normal maximum operating capacity. Lowest storage in Lake Oroville in 1994 was 1,548,034 AF on November 8. By December 31, 1994, storage rebounded to 1,668,244 AF, 47 percent of normal maximum operating capacity.

Lake Oroville's computed inflow is tabulated in Table 8 and plotted along with releases, diversions, and storage withdrawals on Figure 11. A ten-year historical summary of Lake Oroville's storage and inflow is illustrated on Figure 12.

Water temperatures on and below the lake's surface are monitored very closely throughout the year at

various locations around the lake. The two intakes to the powerplant have shutters that control the depth from which water enters the plant. The temperature of water entering the fish hatchery can then be controlled by adding or removing shutters as necessary. A complete illustration of water temperature and intake operation is shown on Figure 14. Further discussions on water temperature operations are detailed in "Water Deliveries and Aqueduct Operations."

Water Deliveries

Project water stored in the Upper Feather River Area lakes flows into Lake Oroville through the North and Middle Forks of the Feather River. Contract deliveries totaled 9,413 AF to two agencies. Non-project deliveries (prior water rights) totaling 1,052 AF were made out of Lake Davis and Frenchman Reservoir.

Water stored in Lake Oroville is released into the Thermalito Diversion Dam Pool, from which releases are made into both the Feather River and the Thermalito Power Canal. The power canal supplies water first to the Thermalito Forebay and then to Thermalito Afterbay. From the Thermalito Afterbay, water is released to the Feather River and several local distribution systems used to deliver water to prior water right holders. These deliveries are collectively called the Feather River Service Area diversions. FRSA diversions are not considered SWP benefits, as they predate the SWP construction, and would have occurred in the absence of the SWP to the limit of available natural river flows. Nearly all FRSA diversions are for agricultural use and totaled 862,779 AF in 1994, an increase of 53,165 AF over 1993. All FRSA diversions are detailed below:

Sutter Butte Canal	492,379
Richvale Canal	95,010
Sunset Pumps	9,586
Western Canal Lateral	3,565
Western Canal	223,126
Tudor Mutual	4,071
Garden Highway	16,661
Plumas Mutual	9,561
Oswald Water District	1,511
Palermo Canal	7,309
Total in AF	862,779

Delta Field Division

Water Storage

The Delta Field Division consists of the North Bay Aqueduct, the South Bay Aqueduct, and the California Aqueduct from Clifton Court Forebay to Check 12. Along these waterways, water storage operations take place at Clifton Court Forebay, Bethany Reservoir, Travis Tank, Napa Terminal Tank, the California Aqueduct, and Lake Del Valle. Water storage data in the South Bay Aqueduct are not reported; storage changes are assumed to be zero for operational purposes.

Releases from Lake Del Valle into the South Bay Aqueduct usually occurs in the fall and is detailed in Table 11. Inflow and storage changes for the last ten years at Lake Del Valle are shown on Figure 15.

Project water flows from the Delta into Clifton Court Forebay through the Clifton Court control gates. A schedule of daily gate operation is published in the *SWP Monthly Report of Operations*. Monthly inflows to Clifton Court Forebay along with corresponding storage changes are shown in Table 11.

Water Deliveries

The Delta Field Division delivered 175,985 AF of water in 1994. These and other deliveries are summarized in Table 2.

The North Bay Aqueduct system, completed in May 1988, begins in the North Delta at the Barker Slough Facilities. Sacramento River water is conveyed through Cache, Lindsey, and Barker sloughs to the Barker Slough Pumping Plant. From the pumping plant, water is conveyed by pipe for 24 miles northwest to contractors in Napa and Solano Counties and to the Cordelia Pumping Plant. Deliveries are made to Solano County water users via turnouts along the pipe's length. From the Cordelia Pumping Plant, the North Bay Aqueduct terminates at the Napa Terminal Tank. The Aqueduct supplied 37,782 AF to Napa and Solano counties.

A division-wide total of 175,606 AF, excluding federal and recreation deliveries, went to SWP entitlement contractors. This includes 116,821 AF of 1994 entitlement deliveries, 18,866 AF of interruptible entitlement, 5,760 AF of 1994 Water Bank wa-

ter to Oak Flat Water District and Santa Clara Valley Water District, 5,734 AF of Vallejo Permit Water (local water right) to Solano Flood Control and Water Conservation District, 18,760 AF of 1994 Purchase Water conveyed to Alameda County Flood Control and Water Conservation District, Zone 7, and to the Santa Clara Valley Water District, and 9,665 AF of other water.

Pumping Plants

Delta Field Division pumping plants include Barker Slough Pumping Plant and Cordelia Pumping Plant on the North Bay Aqueduct, Banks on the California Aqueduct, and South Bay and Del Valle Pumping Plants on the South Bay Aqueduct. Monthly pumping data is summarized for the year in Table 1.

Banks Pumping Plant was originally built to accommodate 11 units. Initially, seven pumps were constructed for a total pumping capacity of 6,400 cfs. Construction of the final four pumps was completed in 1990, each with a design capacity of 1,067 cfs and this increased the plant capacity to 10,500 cfs. Export pumping rates are increased at night and on weekends to take advantage of less costly off-peak electricity. This produces sharp peaks in the export rate at about 7-day intervals.

In 1994, the SWP diverted 1,666,113 AF of water at Banks Pumping Plant, including 44,984 AF of CVP water wheeled by the Department. Below is a five year summary of federal, State, and total pumping at Banks:

Pumping at Banks Pumping Plant (in AF)			
Year	Federal	State	Total
1994	44,984	1,621,129	1,666,113
1993	196,169	3,013,955	3,210,124
1992	34,816	1,467,844	1,502,660
1991	51,642	1,643,819	1,695,461
1990	205,208	2,210,756	2,415,964

San Luis Field Division

Water Storage

San Luis Reservoir reached its maximum end-of-month storage for the year, 2,031,140 AF, at the end of January. Maximum operating storage capacity in San Luis is 2,027,835 AF. Minimum end-of-month storage for the year, 298,254 AF, occurred in August. The State's share of San Luis Reservoir end-of-month storage reached the maximum of 1,066,980 AF in January, while the minimum of 289,162 AF was reached in August. Table 13 (below) and Figure 16 show San Luis Reservoir operations during 1994. Table 14 shows the monthly operation of O'Neill Forebay during 1994.

Pumping and Generating Plants

Total pumping in 1994 at Gianelli Pumping-Generating Plant was 1,113,305 AF. Total water released from San Luis Reservoir to O'Neill Forebay for generation was 1,771,176 AF. Total pumping at Dos Amigos Pumping Plant in 1994 was 2,793,271 AF, about 205,373 AF less than was pumped in 1993. Table 15 summarizes joint-use plant activity on a monthly basis.

Water Deliveries

SWP water deliveries in the San Luis Field Division during 1994 included 1,303 AF of State and federal deliveries to the DFG and DPR from the O'Neill Forebay/San Luis Reservoir area (Reach 3). Deliveries to DFG out of Reach 5 totaled 180 AF. The following tabulation details the components of these recreation deliveries:

O'Neill Forebay and San Luis Reservoir (Reach 3)			
	DPR	DFG	Total
State	77	460	537
Federal	62	376	438
Sub-total	139	836	1,075
Pools 16, 17, & 18 (Reach 5)			
	DPR	DFG	Total
State	180	0	180
Federal	0	148	148
Sub-total	180	148	328
Total	319	984	1,303

Federal deliveries from the joint-use facilities in the San Luis Field Division during 1994 totaled 960,148 AF.

**Table 13. San Luis Reservoir Monthly Operation
1994**

(In acre-feet except as noted)

Month	Reservoir Storage			Inflow	Outflow			Gain (+) Loss (-)	Evaporation	Precipitation(in inches)
	Water Surface Elevation (in feet)	Storage	Storage Change	Gianelli P-G Plant Pumping	Gianelli P-G Plant Generation	Pacheco Tunnel	Recreation Deliveries			
Jan	543.26	2,031,140	45,591	55,024	0	6,855	0	-2,578	982	1.41
Feb	543.25	2,031,013	-127	4,021	0	5,341	0	-1,193	1,749	2.92
Mar	540.60	1,997,419	-33,594	12,828	37,816	6,283	0	-2,323	5,008	0.20
Apr	524.00	1,791,462	-205,957	0	201,880	3,457	0	-620	7,098	0.67
May	505.40	1,570,063	-221,399	0	219,046	2,434	0	81	8,959	0.90
Jun	454.43	1,016,523	-553,540	0	544,954	12,149	0	3,563	112,292	0.00
Jul	395.58	448,206	-528,317	0	523,326	13,577	0	8,586	10,923	0.00
Aug	368.88	298,254	-189,952	41,511	218,139	14,068	0	744	8,035	0.00
Sep	395.93	490,921	192,667	235,343	18,944	13,078	0	-10,654	5,687	0.03
Oct	411.58	617,952	127,031	143,395	1,982	8,360	0	-6,022	3,902	0.48
Nov	438.28	858,423	240,471	259,032	0	7,135	0	-11,426	1,807	1.34
Dec	471.84	1,196,575	338,152	362,151	5,089	9,148	18	-9,744	629	0.40
Total			-788,974	1,113,305	1,771,176	101,885	18	-29,200	67,071	8.35

San Joaquin Field Division

Water Deliveries

A total of 880,018 AF of deliveries were made in the San Joaquin Field Division in 1994. There were six SWP water service contractors who took delivery of 831,648 AF and 48,370 AF was federal wheeling. Water types include entitlement water, groundwater demonstration, carryover entitlement, drought bank, local, exchange, and transfer water. Kern County Water Agency (KCWA) represented 97 percent of the total SWP water delivered within the Division.

In addition to SWP deliveries, 48,370 AF of federal water was wheeled through SWP facilities. The table below itemizes federal wheeling in the San Joaquin Field Division.

Federal Wheeling	
Agency	Agency Total
Kern National Wildlife Refuge	13,402
Fresno County	1,050
Hills Valley Irrigation District	1,421
Kern-Tulare Water District	7,054
Lower Tule River	7,686
Pixley Irrigation District	10,886
Rag Gulch Water District	2,339
Tri-Valley Water District	485
Tulare County	2,047
Total Federal Wheeling	48,370

In 1994, SWP conveyed a total of 21,708 AF of drought water bank water to two long-term SWP contractors (18,183 AF to Kern County Water Agency and 3,525 AF to Tulare Lake Basin Water Storage District).

Map 2 and Table 2 break down water deliveries by agency and water type and show totals.

The San Joaquin Field Division is the only field division in the SWP where there are no water storage facilities. All deliveries are made from the Aqueduct and are summarized in the Appendix, Table 22.

Pumping Plants

Pumping plants in the San Joaquin Field Division include Las Perillas and Badger Hill on the Coastal Aqueduct, and Buena Vista, Teerink, Chrisman, and Edmonston on the California Aqueduct. A complete monthly summary of amounts pumped at all of these plants is shown on Table 1. A summary of energy used to pump at each plant is shown on Table 4.

During 1994, 1,799,652 AF State water and 57,632 AF federal water flowed past Check 21 into the San Joaquin Field Division. Water pumped through Edmonston Pumping Plant for use in the Southern Field Division totaled 917,210 AF.

Southern Field Division

Water Storage

There are four storage reservoirs in the Southern Field Division (Pyramid, Castaic, Silverwood, and Perris) with a combined storage capacity of 701,320 AF. Combined storage at the beginning of the year was 565,372 AF. End-of-year combined storage was 486,116 AF. Complete monthly operation tables for all four reservoirs plus Elderberry Forebay and Castaic Lagoon, along with historical inflow and storage data for the last ten years, is summarized in Tables 16 through 21 and Figures 17 through 20.

Natural inflow storage is accounted for by the SWP in both Pyramid Lake and Castaic Lake by adding the natural inflow and subtracting the stream flow release. Natural inflow storage shares in Pyramid Lake were negative from April through December because the SWP released more stream flow than had naturally flowed into the lake during that time.

Water Deliveries

SWP deliveries in the Southern Field Division totaled 965,021 AF. Eleven agencies received the water, which was almost all entitlement water. One exception was 2,918 AF of recreation water to the California Department of Parks and Recreation.

Pumping and Generating Plants

Pumping plants in the Southern Field Division include Oso and Castaic on the West Branch, and Pearblossom on the East Branch. A complete monthly summary of amounts pumped is shown on Table 1. A summary of energy used to pump and of station service energy at each plant is shown on Table 4.

Generating plants in the Southern Field Division include Warne and Castaic on the West Branch, and Alamo and Devil Canyon on the East Branch. Energy available from each generating plant is summarized in Table 3. Combined generation at all four plants totaled 1,147,716 MWh.

Table 1. Project Pumping by Plant

1994

(in acre-feet)

Pumping Plants	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Totals
Hyatt*	16,492	8,621	30,262	34,573	16,809	40,779	16,960	32,642	45,021	35,842	43,487	74,561	396,049
Thermalito*	18,050	10,487	31,739	44,833	18,057	43,585	14,037	29,571	32,200	27,423	43,206	65,772	378,960
Barker Slough	2,548	2,101	2,845	3,460	3,847	5,237	4,254	4,592	4,124	4,484	2,618	2,849	42,959
Cordelia	1,678	1,459	1,517	2,328	2,472	2,529	2,421	2,919	2,840	2,046	1,901	2,217	26,327
Banks													
State	212,581	105,321	114,999	19,592	43,206	19,187	100,969	168,819	214,716	169,702	211,585	240,452	1,621,129
Federal	0	1,135	71	0	0	0	3,000	40,778	0	0	0	0	44,984
Total	212,581	106,456	115,070	19,592	43,206	19,187	103,969	209,597	214,716	169,702	211,585	240,452	1,666,113
South Bay	9,227	9,778	11,840	16,044	16,815	12,697	13,264	15,163	10,522	5,710	4,204	4,927	130,191
Del Valle	0	1,056	1,424	4,400	5,585	704	0	0	0	0	0	0	13,169
Gianelli* 1/													
State	5,838	2,006	10,159	0	0	0	0	30,358	121,110	6,769	150,066	186,360	512,666
Federal	49,186	2,015	2,669	0	0	0	0	11,153	114,233	136,626	108,966	175,791	600,639
Total	55,024	4,021	12,828	0	0	0	0	41,511	235,343	143,395	259,032	362,151	1,113,305
O'Neill* 2/													
State	0	0	0	0	0	0	0	0	0	0	0	0	0
Federal	110,293	150,573	53,838	26,231	3,768	0	1,300	24,884	115,503	45,019	107,539	200,028	838,976
Total	110,293	150,573	53,838	26,231	3,768	0	1,300	24,884	115,503	45,019	107,539	200,028	838,976
Dos Amigos 1/													
State	145,614	151,617	117,330	156,407	185,725	272,428	338,855	217,256	97,633	63,793	55,251	58,726	1,860,635
Federal	112,501	101,128	63,543	57,159	52,434	176,461	220,300	135,649	1,748	0	0	11,713	932,636
Total	258,115	252,745	180,873	213,566	238,159	448,889	559,155	352,905	99,381	63,793	55,251	70,439	2,793,271
Buena Vista	91,734	51,659	73,900	111,818	128,556	138,260	181,245	115,295	62,869	45,756	37,446	33,324	1,071,862
Teerink	89,516	45,819	62,061	103,361	123,396	118,892	158,512	99,639	59,664	44,296	36,410	32,037	973,603
Chrisman	89,027	44,251	61,045	102,250	120,985	113,791	152,541	97,130	57,923	44,029	36,108	31,413	950,493
Las Perillas	1,699	3,375	6,975	10,535	12,019	18,187	21,505	15,122	5,558	4,433	803	1,003	101,214
Badger Hill	1,765	3,521	7,343	10,980	12,065	19,652	22,208	15,320	5,786	4,653	853	1,074	105,220
Edmonston	88,193	44,134	58,822	99,993	117,276	109,572	145,925	90,610	54,852	41,707	35,057	31,069	917,210
Pearblossom	28,785	1,860	6,738	52,652	53,741	61,371	70,149	39,917	35,125	22,584	19,453	22,328	414,703
Oso	56,226	41,890	48,955	39,777	54,164	36,891	63,605	39,209	10,461	12,575	11,139	4,720	419,612
Castaic* 3/	47,676	47,030	47,932	35,369	49,287	36,167	59,616	36,535	7,649	9,555	26,134	15,413	418,363

1/ Joint State-federal facility.

2/ O'Neill Pumping Plant is a federal facility.

3/ Castaic Pumping Plant pumps water for the city of Los Angeles.

* Pumping-generating plants. This table includes only the pumping portion of operations of these plants.

Table 2. Water Deliveries 1962-1994

(in acre-feet)

Agency	1962-1989	1990	1991	1992	1993	1994	TOTALS
Oroville Field Division							
Last Chance Creek W.D. (Local Supply)	184,560	7,046	7,010	4,988	10,879	8,921	223,404
Plumas Co. F.C. & W.C.D.*	7,184	548	420	485	444	492	9,573
County of Butte*	6,014	380	328	117	256	329	7,424
Thermalito I.D. (Local Supply)	21,668	2,272	2,124	2,315	2,096	2,318	32,793
Prior Water Rights Deliveries	1/ 17,583,923	867,623	558,143	608,692	811,435	863,831	21,293,647
Yuba City*	1,292	494	265	642	746	1,035	4,474
Delta Field Division							
Napa CO. F.C. & W.C.D.* (Local Supply)	111,745	13,313	10,018	5,510 6/	5,286	6,792	152,664
Alameda Co. W.D.* (Local Supply)	501,565	31,703	30,126	24,250	14,909	22,911	625,464
A.C.F.C. & W.C.D., Zone 7* (Local Supply)	412,970	33,975	14,101	23,084	43,390	37,190	564,710
Pleasanton Township W.D.	674	0	0	0	0	0	674
Santa Clara Valley W.D.*	1,429,017	120,962	87,253	42,839	62,065	69,495	1,811,631
Marin W.D.	4,594	0	0	0	0	0	4,594
San Francisco W.D.	4,345	332	51,135	21,255	5,219	0	82,286
Skylonda M.W.D.	10	0	0	0	0	0	10
Oak Flat W.D.*	125,562	3,212	1,472	2,239	2,858	3,831	139,174
Mustang W.D.	4,256	0	0	0	0	0	4,256
Granite Construction	120	0	0	0	0	0	120
Lake Del Valle (E.B.R.P.D.)	1,834	168	150	147	143	168	2,610
Orestimba Creek	100	0	0	0	0	0	100
Recreation Fish and Wildlife	0	0	0	0	0	4,397	4,397
Federal Customers	4,882	38	77	154	208	211	5,570
Solano Co. F.C.W.C.D.*	33,766	19,879	24,527	26,086	29,806	30,990	165,054
San Luis Field Division							
Dept. Parks & Rec. (STATE)	645	70	59	72	66	77	989
Dept. Fish & Game (STATE)	6,281	145	110	391	724	640	8,291
Fed. Customers (Rec.+ Joint-Use)	23,169,944	991,850 5/	504,287	541,473	943,200	960,626	27,111,380
Fed. Customers (Misc.)	247,586	172	114	95	76	108	248,151
Westlands Water District	0	10,900 7/	0	0	0	0	10,900
San Joaquin Field Division							
Tulare Lake Basin W.S.D.*	2,441,250	90,312	2,180	78,558	123,290	85,029	2,820,619
Empire West Side I. D.*	75,372	3,310	221	1,354	2,741	1,666	84,664
County Of Kings*	49,900	2,000	0	1,806	4,000	2,116	59,822
Hacienda W.D.	2/ 75,895	0	0	0	0	0	75,895
Kern County Water Agency*	16,669,974	862,448 8/	223,928	446,625	1,081,856	700,996	19,985,827
Kern Water Bank	4/ 7,501	0	0	0	0	0	7,501
Dudley Ridge Water District*	9/ 1,196,341	36,657	14,454	13,945	23,418	32,419	1,317,234
Devils Den Water District*	332,791	6,440	716	0	0	0	339,947
J.G. Boswell	117,430	0	0	0	0	0	117,430
Shell Cal Prod.	3/ 85,914	0	0	0	0	0	85,914
Castaic Lake Water Agency*	0	0	0	0	4,157	9,422	13,579
Green Valley Water District	11,054	0	0	0	0	0	11,054
Federal Wheeling	1,037,381	74,746	23,845	34,154	12,552	48,370	1,231,048
M.W.D. Of S.C.	0	0	0	0	50,000	0	50,000
Wheeler Ridge W.S.D.	92	0	0	0	0	0	92
Southern Field Division							
A.V.E.K. W.A.*	625,813	47,206	8,607	31,927	44,616	50,552	808,721
M.W.D. Of S.C.*	9,960,649	1,396,423	606,447	716,250	602,190	807,946	14,089,905
Littlerock Creek I. D.*	7,477	1,747	522	251	734	1,098	11,829
Mojave Water Agency*	57,815	0	2,032	9,334	10,220	16,253	95,654
Desert Water Agency*	335,300	38,100	11,430	17,197	38,100	23,257	463,384
Coachilla Valley Water District*	210,732	23,100	6,930	10,427	23,100	14,102	288,391
Crestline-Lake Arrowhead Water Agency*	21,911	1,950	1,561	264	946	1,193	27,825
San Gabriel Valley M.W.D.*	101,782	16,649	5,399	11,971	14,397	15,230	165,428
San Bernardino Valley M.W.D.*	223,508	18,831	7,177	5,113	6,552	9,135	270,316
Santa Barbara	0	0	1,240	0	0	0	1,240
Dept. Parks & Rec., L.A. Co. Rec. Dept.	40,429	8,879	4,560	1,995	1,676	2,918	60,457
Piru Creek Fish Enhancement	2,915	0	0	0	0	0	2,915
Castaic Lake Water Agency*	120,566	22,139	7,357	14,812	13,787	14,919	193,580
Palmdale Water District*	20,812	8,608	3,914	4,035	7,761	8,418	53,548
United Water C.D. (Local Supply)	998	0	0	0	0	0	998
Ventura County FCD*	0	4,836	988	0	0	0	5,824
Los Angeles Dept. of Water and Power	0	0	0	16	0	0	16
Lilico Pictures	10	0	0	0	0	0	10
Totals	77,696,149	4,769,463	2,225,227	2,704,868	3,999,899	3,859,401	95,255,007

* Long-term contractors

1/ Includes Thermalito Afterbay, Palermo Canal, Upper Feather lakes deliveries.

2/ Hacienda Water District was annexed by Tulare Lake Basin W.S.D. in 1981.

3/ Repayment of pre-consolidation water.

4/ Advance storage of ground water, by agreement between K.C.W.A. and D.W.R.

5/ Does not include 543 AF to the City of Avenal due to a previous overcharge.

6/ Includes 237 AF of Vallejo Permit water transferred to Napa.

7/ Includes 2,000 AF of General Wheeling for Oroville-Wyandotte I.D.

8/ Includes 150,000 AF of 1990 Kern Ground Water Demo.

9/ Includes 2,500 acre-feet of transferred entitlement water.

Table 3. Project Energy Resources
1994

(in megawatt-hours)

Resource	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Totals
Hyatt-Thermalito 1/	77,973	51,685	76,006	125,148	168,379	185,184	215,556	172,927	137,847	120,330	80,103	89,486	1,500,624
Gianelli													
State	0	0	7,119	31,679	27,493	57,833	36,238	13,905	1,600	-7	0	975	176,835
Federal	0	0	3,408	22,911	28,186	61,614	55,714	14,688	1,232	325	0	0	188,078
Total	0	0	10,527	54,590	55,679	119,447	91,952	28,593	2,832	318	0	975	364,913
CEA Energy 2/	34,380	29,900	32,600	33,780	36,700	0	0	52,190	46,970	49,050	46,970	49,960	412,500
Warne 3/	32,685	25,008	30,439	24,824	31,617	21,105	36,549	23,371	6,622	7,700	9,406	3,160	252,486
Castaic	39,428	48,312	46,752	39,376	51,768	33,960	62,136	34,800	11,928	12,154	18,432	11,424	410,470
Alamo	0	0	0	0	0	0	0	0	0	0	401	1,129	1,530
Devil Canyon	15,449	11,575	22,497	45,149	70,853	86,490	72,830	47,849	41,483	24,686	18,371	25,998	483,230
Tera Corp.	8	38	202	568	732	726	979	823	584	197	100	9	4,966
MWD Hydro	9,721	77,869	8,118	10,542	17,477	18,538	15,887	14,353	13,663	9,049	8,811	9,368	213,396
Reid Gardner	120,283	122,089	102,839	114,246	0	98,243	125,481	133,323	109,427	82,304	107,367	93,014	1,208,616
Pine Flat	0	1,233	4,396	14,310	29,172	92,176	55,932	9,343	0	0	0	0	206,562
Purchases 4/	63,309	47,760	54,600	52,000	107,265	72,049	77,665	56,917	70,280	71,732	43,200	56,815	773,592
Other Sources/Exchanges 5/	3,484	7,883	27,990	32,606	10,767	34,887	16,134	22,565	33,930	26,629	31,577	30,901	279,353
SCE Return Additional	282,064	143,203	143,214	166,560	53,965	-2,284	137,606	199,938	119,375	115,194	225,572	206,237	1,790,644

1/ Includes Table Mountain and Hyatt out adjusted to Tesla.

2/ Capacity Exchange Agreement energy from SWP system to Southern California Edison.

State: 7,714,804

3/ Includes station-service energy.

Federal: 188,078

4/ Includes Salt River Project; Sacramento Municipal Utility District; Southern California Edison; Bonneville Power Authority; Pacific Gas and Electric; Washington Water and Power Co.; Montana Power Co.; Arizona Public Service Co.; Pacific Power and Light; Western Area Lower Colorado; Los Angeles Department of Water and Power; Puget Sound Power and Light; and Northern California Power Agency.

Total Project: 7,902,882

5/ Includes Southern California Edison; Western Area Mid-Pacific; Los Angeles Dept. of Water and Power; Bonneville Power Authority; City of Vernon; and Pacific Gas and Electric.

Table 4. Project Energy Loads
1994

(in megawatt-hours)

Source	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Totals
Hyatt-Thermalito													
Pumpback and													
Station Service	14,025	7,440	26,322	31,549	15,103	34,380	12,934	24,626	31,977	25,597	32,157	54,006	310,116
North Bay 1/	1,032	1,176	1,260	1,176	1,176	1,176	1,260	2,804	2,600	650	1,600	1,412	17,322
Banks													
State	61,888	30,540	33,063	6,186	12,905	6,079	28,651	47,918	62,099	48,301	60,970	69,222	467,821
Federal	0	336	21	0	0	0	891	12,111	0	0	0	0	13,359
South Bay	7,711	8,259	10,007	13,894	14,567	10,998	11,822	13,254	9,370	4,703	3,434	3,988	112,007
Del Valle	9	57	99	256	411	57	7	7	7	6	6	22	944
Bottle Rock 2/	113	109	97	71	66	60	52	59	63	71	70	70	901
Gianelli													
State	3,026	1,582	5,010	271	260	126	137	5,657	23,929	1,875	36,624	54,714	133,211
Federal	23,950	800	1,050	0	0	0	0	2,050	22,883	31,072	31,511	50,577	163,893
Dos Amigos													
State	18,970	19,656	14,809	20,442	24,083	35,416	44,879	28,094	12,401	8,341	7,332	7,917	242,341
Federal	14,674	13,024	7,992	7,463	6,801	22,956	29,151	17,577	204	0	0	1,555	121,397
Pine Flat 2/	156	164	27	90	0	0	0	56	183	193	0	184	1,053
Las Perillas	147	250	525	775	868	1,358	1,600	1,123	410	324	81	102	7,563
Badger Hill	332	623	1,399	2,064	2,297	3,644	4,316	2,982	1,048	830	164	206	19,905
Buena Vista	22,587	12,736	18,026	27,209	31,269	33,637	44,155	28,030	15,396	11,291	9,319	8,303	261,958
Teerink	24,491	12,517	16,931	28,040	33,152	31,903	42,060	26,515	15,943	12,168	10,196	9,059	262,975
Chrisman	55,725	28,420	37,951	63,423	75,026	70,613	93,727	59,402	35,476	26,893	22,509	20,250	589,415
Edmonston	198,621	99,478	133,919	224,035	262,914	245,390	327,763	204,685	122,824	93,384	79,298	71,205	2,063,516
Oso	15,283	11,409	13,127	10,736	14,523	9,952	16,941	10,864	3,063	3,633	3,281	1,562	114,374
Pearblossom	19,854	1,730	5,020	35,927	36,825	41,887	47,480	27,254	24,000	15,751	13,672	15,549	284,949
Warne 2/	49	37	6	11	28	77	16	78	127	91	93	134	747
Sales	191,738	277,137	172,667	173,518	28,891	110,299	112,232	231,735	172,941	216,339	254,895	218,763	2,161,155
Other Project Loads 3/	24,036	33,559	41,930	33,656	33,407	37,825	37,408	46,794	40,709	34,870	36,955	23,213	424,362
Actual Deviation	91	244	745	-29	-206	92	554	1,165	856	175	1,006	26	4,719
Losses	18,901	19,430	23,830	17,491	18,623	23,937	25,000	19,205	18,286	13,533	16,646	18,568	233,450

1/ Includes Barker Slough, Cordelia, and Cordelia Interim pumping plants.

2/ Station Service only.

3/ Includes Southern California Edison; City of Vernon; Bonneville Power Authority; Nevada Power Authority; Pacific Gas and Electric; and Project Emergency Service.

Total State: 7,714,804

Total Federal: 298,649

Total Project: 8,013,453

Table 5. Delta Outflow Index
1994

(in cfs-days except as noted)

Date	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	10,059	13,943	14,584	10,062	8,571	3,995	3,929	2,990	3,827	3,487	4,003	4,401
2	10,486	11,892	15,632	7,694	7,612	3,895	4,133	2,525	3,589	3,523	4,106	6,578
3	10,679	11,687	15,652	8,025	7,188	4,087	4,184	2,682	3,149	3,613	3,529	8,674
4	10,804	11,160	14,858	8,355	6,944	4,405	4,427	3,175	3,524	3,513	3,963	10,204
5	10,458	11,449	14,557	7,935	6,811	4,372	4,525	3,010	3,117	3,500	4,043	15,926
6	10,996	11,194	14,905	6,615	6,975	4,166	4,826	2,506	3,046	3,003	6,457	27,474
7	10,484	6,005	13,913	6,677	7,020	3,928	5,083	2,555	3,000	2,847	5,272	29,512
8	11,184	5,780	14,462	6,527	7,184	4,156	5,026	2,494	2,836	3,205	5,719	19,470
9	11,520	13,502	14,704	6,253	8,201	4,136	4,908	2,621	3,238	3,131	5,082	13,541
10	11,519	27,608	14,042	6,414	9,653	4,283	5,594	2,570	3,421	2,520	4,194	10,981
11	11,063	26,649	13,135	7,323	10,851	4,047	5,204	2,003	4,137	2,516	4,991	11,458
12	11,097	23,187	12,979	7,176	10,026	4,876	5,106	1,940	4,161	2,064	3,786	11,036
13	10,432	20,258	12,119	6,967	9,013	4,234	4,591	2,064	4,013	2,039	4,572	10,513
14	10,422	19,285	11,707	6,978	8,192	4,353	4,101	2,127	4,224	2,074	4,617	9,155
15	9,761	17,607	11,716	6,971	8,009	3,935	4,073	2,002	4,274	2,510	4,087	5,898
16	9,472	15,048	11,211	6,861	7,922	3,720	4,307	3,019	3,385	1,639	5,829	8,855
17	9,594	12,946	11,517	6,887	7,959	3,699	4,122	3,490	2,379	2,064	5,280	12,524
18	10,525	12,378	11,125	6,971	7,347	3,720	4,029	4,582	2,436	2,551	4,613	14,876
19	10,807	12,901	10,395	5,580	6,981	3,817	4,484	3,528	1,854	3,003	4,547	13,290
20	10,785	16,392	11,095	6,819	6,768	4,148	4,944	3,454	1,556	2,991	4,087	12,346
21	10,459	20,714	11,224	6,917	6,534	4,250	4,902	3,040	1,114	2,526	4,005	11,070
22	10,386	22,540	10,520	7,019	6,379	4,420	4,609	3,096	1,284	3,081	4,079	8,586
23	8,884	27,233	10,135	6,874	6,786	4,619	4,557	2,567	1,139	3,017	3,547	5,202
24	9,302	27,204	10,348	6,876	5,712	4,642	4,583	2,708	550	4,053	3,403	4,360
25	8,249	24,130	9,350	7,748	6,898	4,450	4,566	2,564	596	5,075	3,566	4,542
26	11,932	20,467	9,366	8,208	4,187	4,530	3,945	2,923	625	4,272	3,564	4,810
27	18,200	17,962	9,519	8,868	3,855	4,101	3,525	3,072	705	3,524	4,235	4,260
28	19,522	16,049	8,724	8,916	4,409	4,050	2,990	3,358	639	3,510	3,084	3,988
29	16,722		7,728	9,080	3,800	4,185	2,476	3,560	1,471	3,596	3,328	3,413
30	12,537		10,262	7,885	4,180	4,040	2,506	3,012	600	3,757	2,362	3,766
31	12,023		11,047		3,982		3,025	4,040		3,555		6,011
Total	350,363	477,170	372,531	221,481	215,949	125,259	133,280	89,277	73,889	95,759	127,950	316,720
Ave.	11,302	17,042	12,017	7,383	6,966	4,175	4,299	2,880	2,463	3,089	4,265	10,217
Max.	19,522	27,608	15,652	10,062	10,851	4,876	5,594	4,582	4,274	5,075	6,457	29,512
Min.	8,249	5,780	7,728	5,580	3,800	3,699	2,476	1,940	550	1,639	2,362	3,413
Total In AF	694,945	946,467	738,915	439,308	428,335	248,451	264,361	177,081	146,559	189,938	253,789	628,214

Annual Total = 2,599,628 cfs days
or 5,156,362 acre-feet

Table 6. Sacramento Basin and Sacramento-San Joaquin Delta Operations
1994

(in thousands of acre-feet except as noted)

Month	Upstream Reservoir Releases to River			Sacramento River Accretions or Depletions 2/	Delta Inflow			Delta Uses			Delta Exports		
	Keswick 1/	Oroville 1/	Nimbus		Sacramento River at Sacramento 3/	San Joaquin River at Vernalis 4/	Total 5/	Consumptive	Outflow Index		Total	DWR	USBR 6/
									Total	Average CFS			
Jan	253	113	108	395	881	109	990	-56	695	11	359	213	146
Feb	186	97	84	754	1,122	112	1,234	-37	946	17	326	105	221
Mar	201	108	92	459	831	137	968	-10	739	12	262	115	147
Apr	293	128	67	57	498	110	608	63	439	7	121	20	101
May	487	112	63	-102	532	121	653	121	428	7	121	43	78
Jun	568	122	114	-294	480	65	545	191	248	4	110	19	91
Jul	730	219	135	-322	724	70	794	268	264	4	268	101	167
Aug	693	160	107	-205	745	56	801	252	177	3	332	169	163
Sep	534	173	60	63	857	54	911	174	320	5	438	215	223
Oct	274	161	43	47	534	84	618	118	190	3	331	170	161
Nov	239	99	87	173	591	77	668	55	254	4	367	212	155
Dec	247	77	92	630	1,013	80	1,093	2	628	10	464	240	224
Total	4,705	1,569	1,052	1,655	8,808	1,075	9,883	1,141	5,328	---	3,499	1,622	1,877

1/ Time lagged values (Keswick: 5 days; Oroville: 2 days).

2/ Positive values are accretions; negative values are depletions.

3/ These values are based on a measured daily average taken from the Sacramento River at Freeport.

4/ These values are based on daily 6 a.m. readings.

5/ Includes Sacramento County Regional Waste Treatment Plant.

6/ USBR water pumped at Banks Pumping Plant plus water pumped at Tracy and Contra Costa pumping plants.

Table 7. Upper Feather Area Lakes Monthly Operation

1994

(in acre-feet except as noted)

Month	Lake Storage			Outflow							Inflow
	Water Surface Elevation (in feet)	Storage	Storage Change	Stream-Flow Maint.	Water Supply Contract	Prior Water Rights	Total Regulated Release	Spill	Estimated Evaporation and Seepage	Total Outflow	Computed

Antelope Lake Capacity 22,566 acre-feet

Jan	4994.29	16,038	-647	1,230	0	0	1,230	0	54	1,284	637
Feb	4994.34	16,076	38	703	0	0	703	0	59	762	800
Mar	4996.23	17,556	1,480	615	0	0	615	0	93	708	2,188
Apr	4998.20	19,183	1,627	595	0	0	595	0	165	760	2,387
May	4998.79	19,686	503	615	0	0	615	0	275	890	1,393
Jun	4997.75	18,804	-882	595	0	0	595	0	495	1,090	208
Jul	4996.34	17,645	-1,159	615	0	0	615	0	624	1,239	80
Aug	4994.89	16,499	-1,146	615	0	0	615	0	592	1,207	61
Sep	4993.72	15,606	-893	595	0	0	595	0	358	953	60
Oct	4992.67	14,833	-773	615	0	0	615	0	219	834	61
Nov	4992.35	14,602	-231	595	0	0	595	0	116	711	480
Dec	4992.14	14,451	-151	615	0	0	615	0	79	694	543
Total	---	---	-2,234	8,003	0	0	8,003	0	3,129	11,132	8,898

Frenchman Lake Capacity 55,477 acre-feet

Jan	5570.19	31,579	188	123	0	0	123	0	78	201	389
Feb	5570.52	31,946	367	111	0	0	111	0	78	189	556
Mar	5571.25	32,770	824	123	0	0	123	0	136	259	1,083
Apr	5570.59	32,025	-745	31	799	171	1,001	0	283	1,284	539
May	5568.97	30,245	-1,780	0	1,868	0	1,868	0	363	2,231	451
Jun	5565.80	26,944	-3,301	0	2,614	0	2,614	0	804	3,418	117
Jul	5563.31	24,506	-2,438	0	1,738	0	1,738	0	780	2,518	80
Aug	5560.87	22,246	-2,260	0	1,615	0	1,615	0	656	2,271	11
Sep	5560.18	21,631	-615	48	287	0	335	0	338	673	58
Oct	5559.89	21,375	-256	123	0	0	123	0	167	290	34
Nov	5560.16	21,613	238	119	0	0	119	0	141	260	498
Dec	5560.50	21,915	302	123	0	0	123	0	98	221	523
Total	---	---	-9,476	801	8,921	171	9,893	0	3,922	13,815	4,339

Lake Davis Capacity 84,371 acre-feet

Jan	5768.46	60,236	-269	615	10	0	625	0	235	860	591
Feb	5768.73	61,145	909	555	8	0	563	0	236	799	1,708
Mar	5769.28	63,020	1,875	615	5	0	620	0	409	1,029	2,904
Apr	5769.30	63,089	69	595	27	0	622	0	682	1,304	1,373
May	5768.97	61,955	-1,134	430	40	185	655	0	1,132	1,787	653
Jun	5768.19	59,335	-2,620	405	82	190	677	0	2,087	2,764	144
Jul	5767.30	56,421	-2,914	398	103	217	718	0	2,306	3,024	110
Aug	5766.37	53,467	-2,954	451	100	164	715	0	2,283	2,998	44
Sep	5765.77	51,611	-1,856	440	65	125	630	0	1,322	1,952	96
Oct	5765.28	50,126	-1,485	615	24	0	639	0	1,015	1,654	169
Nov	5765.49	50,759	633	595	14	0	609	0	483	1,092	1,725
Dec	5765.60	51,093	334	615	14	0	629	0	334	963	1,297
Total	---	---	-9,412	6,328	492	881	7,702	0	12,524	20,226	10,814

**Table 8. Lake Oroville Monthly Operation
1994**

(in acre-feet except as noted)

Capacity 3,537,577 acre-feet

Month	Water Surface Elevation (in feet)	Storage	Storage Change	Outflow						Hyatt Pumpback	Computed Inflow 3/
				Hyatt Generation 1/	Palermo Canal	Spillway Leakage 2/	Evap- oration	Spill	Total Outflow		
Jan	818.73	2,410,233	-19,705	135,292	155	0	924	0	136,371	16,492	100,174
Feb	825.18	2,488,895	78,662	90,162	120	42	1,026	0	91,350	8,621	161,391
Mar	836.17	2,627,062	138,167	129,359	227	113	2,472	0	132,171	30,262	240,076
Apr	836.88	2,636,169	9,107	206,713	525	120	3,203	291	210,852	34,573	185,386
May	828.66	2,532,082	-104,087	279,713	734	72	3,738	0	284,257	16,809	163,361
Jun	810.82	2,316,197	-215,885	312,525	1,130	16	5,889	0	319,560	40,779	62,896
Jul	784.74	2,024,329	-291,868	376,675	1,130	0	6,913	0	384,718	16,960	75,890
Aug	763.44	1,806,248	-218,081	315,664	1,160	0	6,726	0	323,550	32,642	72,827
Sep	750.60	1,683,158	-123,090	264,219	1,130	0	4,583	0	269,932	45,021	101,821
Oct	739.97	1,585,818	-97,340	233,590	686	0	2,956	0	237,232	35,842	104,050
Nov	737.93	1,567,602	-18,216	160,422	187	0	818	0	161,427	43,487	99,724
Dec	749.00	1,668,244	100,642	175,216	125	0	315	0	175,656	74,561	201,737
Total	---	---	-761,694	2,679,550	7,309	362	39,563	291	2,727,075	396,049	1,569,332

1/ Includes bypass flows.

2/ Only occurs when lake water elevation is greater than or equal to 813.00 and there is no spill.

3/ Does not include pumpback.

**Table 9. Thermalito Forebay Monthly Operation
1994**

Including Diversion Pool and Power Canal
(in acre-feet except as noted)

Month	Storage 1/	Storage Change	Inflow			Outflow					Losses (-) and Gains (+)
			Lake Oroville Releases 2/	Kelly Ridge Generation	Thermalito Pumpback	Thermalito Generation 3/	County of Butte	Thermalito Irrigation District	Releases to River 4/	Hyatt Pumpback	
Jan	23,154	-416	135,292	8,430	18,050	109,503	5	91	37,980	16,492	1,884
Feb	23,406	252	90,204	12,489	10,487	71,809	25	85	35,419	8,621	3,031
Mar	24,057	651	129,472	14,950	31,739	106,843	44	118	38,596	30,262	353
Apr	23,922	-135	207,124	4,875	44,833	186,794	81	176	37,333	34,573	1,990
May	24,404	482	279,785	2,708	18,057	246,380	0	240	39,219	16,809	2,580
Jun	23,611	-793	312,541	12,532	43,585	292,682	96	308	37,140	40,779	1,554
Jul	23,359	-252	376,675	11,660	14,037	349,779	23	319	38,099	16,960	2,556
Aug	23,953	594	315,664	11,160	29,571	289,125	0	320	38,066	32,642	4,352
Sep	24,152	199	264,219	6,620	32,200	221,443	13	263	37,280	45,021	1,181
Oct	24,106	-46	233,590	12,860	27,423	202,215	3	186	38,000	35,842	2,327
Nov	24,420	314	160,422	9,210	43,206	135,087	14	115	37,040	43,487	3,219
Dec	23,308	-1,112	175,878	13,760	65,772	150,810	25	97	38,792	74,561	7,763
Total		-262	2,680,866	121,253	378,960	2,362,470	329	2,318	452,964	396,049	32,789

1/ Sum of Thermalito Forebay and Diversion Pool.

2/ Sum of releases from Lake Oroville through Hyatt plant, spill, and spillway leakage.

3/ Includes bypass flows.

4/ Sum of Diversion Dam generation plus hatchery.

**Table 10. Thermalito Afterbay Monthly Operation
1994**

(in acre-feet except as noted)

Month	Water Surface Elevation (in feet)	Storage	Storage Change	Inflow	Outflow						Losses (-) and Gains (+)
				Thermalito Generation 1/	Sutter Butte Canal	Western Canal Lateral	Richvale Canal	Western Canal	River Outlet	Thermalito Pumpback	
Jan	129.23	29,641	4,347	109,503	7,980	32	4,120	716	74,060	18,050	-198
Feb	129.75	31,326	1,685	71,809	0	0	0	0	60,970	10,487	1,333
Mar	131.28	36,538	5,212	106,843	799	0	0	0	67,200	31,739	-1,893
Apr	125.17	18,010	-18,528	186,794	47,470	591	4,820	14,010	89,970	44,833	-3,628
May	127.14	23,316	5,306	246,380	81,480	403	16,880	47,330	72,910	18,057	-4,014
Jun	131.54	37,460	14,144	292,682	83,010	756	19,050	42,159	84,380	43,585	-5,598
Jul	127.31	23,803	-13,657	349,677	88,350	897	17,180	43,811	178,800	14,037	-20,259
Aug	130.72	34,586	10,783	289,125	78,280	468	12,620	29,220	119,500	29,571	-8,683
Sep	133.12	43,299	8,713	221,443	34,220	0	1,760	3,080	133,900	32,200	-7,570
Oct	130.77	34,758	-8,541	202,215	31,310	117	1,340	24,720	121,500	27,423	-4,346
Nov	127.33	23,861	-10,897	135,087	19,320	251	8,570	12,690	60,960	43,206	-988
Dec	131.39	36,927	13,066	150,810	20,160	50	8,670	5,390	38,340	65,772	639
Total			11,633	2,362,368	492,379	3,565	95,010	223,126	1,102,491	378,960	-55,205

1/ Includes bypass flows.

Table 11. Lake Del Valle Monthly Operation

1994

(in acre-feet except as noted)

Month	Water Surface Elevation (in feet)	Storage	Storage Change	Inflow		Outflow					Precipitation (inches)
				Natural	South Bay Aqueduct	South Bay Aqueduct	Recreation 1/	Arroyo Valle	Evaporation Losses	Total	
Jan	678.65	25,100	174	225	0	0	5	0	46	51	1.12
Feb	683.34	27,551	2,451	1,622	1,056	184	4	0	39	227	3.41
Mar	686.48	29,308	1,757	467	1,424	0	7	0	127	134	0.01
Apr	693.81	33,742	4,434	210	4,400	0	9	0	167	176	1.06
May	702.24	39,379	5,637	297	5,585	0	9	0	236	245	2.06
Jun	702.63	39,653	274	-3	704	0	21	0	406	427	0.07
Jul	701.08	38,571	-1,082	-86	0	544	25	0	427	996	0.00
Aug	700.26	38,005	-566	-12	0	73	25	0	456	554	0.00
Sep	685.15	34,599	-3,406	146	0	3,050	19	146	337	3,552	0.00
Oct	687.05	29,637	-4,962	-27	0	4,708	8	0	219	4,935	0.57
Nov	680.77	26,181	-3,456	168	0	3,374	15	168	67	3,624	3.45
Dec	679.91	25,737	-444	133	0	396	21	133	27	577	1.57
Total	---	---	811	3,140	13,169	12,329	168	447	2,554	15,498	13.32

1/ To East Bay Regional Park District.

Table 12. Clifton Court Forebay Monthly Operation**1994**

(elevation in feet, storage in acre-feet)

Month	Water Surface Elevation	Storage	Storage Change	Inflow
Jan	0.88	20,160	2,349	214,930
Feb	0.40	19,125	-1,035	106,187
Mar	1.31	21,088	1,963	118,124
Apr	-0.09	18,069	-3,019	19,994
May	-1.95	14,072	-3,997	43,440
Jun	-0.92	16,284	2,212	29,671
Jul	-1.42	15,210	-1,074	107,914
Aug	-0.52	17,144	1,934	216,604
Sep	0.11	18,500	1,356	219,888
Oct	-0.17	17,897	-603	170,870
Nov	0.67	19,707	1,810	213,395
Dec	0.40	19,125	-582	239,827
Total	---	---	1,314	1,700,844

**Table 13. San Luis Reservoir Monthly Operation
1994**

(in acre-feet except as noted)

Month	Reservoir Storage			Inflow	Outflow			Gain (+) Loss (-)	Evaporation	Precipitation (in inches)
	Water Surface Elevation (in feet)	Storage	Storage Change	Gianelli P-G Plant Pumping	Gianelli P-G Plant Generation	Pacheco Tunnel	Recreation Deliveries			
Jan	543.26	2,031,140	45,591	55,024	0	6,855	0	-2,578	982	1.41
Feb	543.25	2,031,013	-127	4,021	0	5,341	0	1,193	2	2.92
Mar	540.60	1,997,419	-33,594	12,828	37,816	6,283	0	-2,323	5,008	0.20
Apr	524.00	1,791,462	-205,957	0	201,880	3,457	0	-620	7,098	0.67
May	505.40	1,570,063	-221,399	0	219,046	2,434	0	81	8,959	0.90
Jun	454.43	1,016,523	-553,540	0	544,954	12,149	0	3,563	112,292	0.00
Jul	395.58	448,206	-568,317	0	523,326	13,577	0	-31,414	10,923	0.00
Aug	368.88	298,254	-149,952	41,511	218,139	14,068	0	40,744	8,035	0.00
Sep	395.93	490,921	192,667	235,343	18,944	13,078	0	-10,654	5,687	0.03
Oct	411.58	617,952	127,031	143,395	1,982	8,360	0	-6,022	3,902	0.48
Nov	438.28	858,423	240,471	259,032	0	7,135	0	-11,426	1,807	1.34
Dec	471.84	1,196,575	338,152	362,151	5,089	9,148	18	-9,744	629	0.40
Total	---	---	-788,974	1,113,305	1,771,176	101,885	18	-29,200	165,324	8.35

Table 14. O'Neill Forebay Monthly Operation

1994

(in acre-feet except as noted)

Month	Reservoir Storage			Inflow				Outflow				Gain (+) Loss (-)
	Water Surface Elevation (in feet)	Storage	Storage Change	Pump In 1/	O'Neill P-G Plant Pumping	Gianelli P-G Plant Generation	California Aqueduct Check 12	O'Neill P-G Plant Generation	Gianelli P-G Plant Pumping	Dos Amigos Pumping	Deliveries	
Jan	223.14	51,420	1,600	0	110,293	0	199,063	336	55,024	258,115	769	6,488
Feb	220.48	44,400	-7,020	0	150,573	0	95,308	0	4,021	252,745	1,519	5,384
Mar	221.27	46,469	2,069	0	53,838	37,816	98,942	3,579	12,828	180,873	812	9,565
Apr	222.52	49,767	3,298	71	26,231	201,880	1,506	16,507	0	213,566	1,095	4,778
May	219.13	40,915	-8,852	101	3,768	219,046	23,392	23,907	0	238,159	981	7,888
Jun	222.77	50,433	9,518	104	0	544,954	3,136	107,424	0	448,889	1,980	19,617
Jul	221.42	46,863	-3,570	103	1,300	523,326	85,958	65,455	0	559,155	3,019	13,372
Aug	222.34	49,288	2,425	101	24,884	218,139	188,536	46,402	41,511	352,905	2,936	14,519
Sep	221.37	46,731	-2,557	75	115,503	18,944	197,426	5,996	235,343	99,381	827	7,042
Oct	221.36	46,705	-26	133	45,019	1,982	159,562	2,426	143,395	63,793	438	3,330
Nov	219.78	42,583	-4,122	105	107,539	0	201,765	1,741	259,032	55,251	123	2,616
Dec	221.15	46,154	3,571	86	200,028	5,089	229,449	0	362,151	70,439	253	1,762
Total	---	---	-3,666	879	838,976	1,771,176	1,484,043	273,773	1,113,305	2,793,271	14,752	96,361

1/ Pump-in located at Mile 79.67R.

**Table 15. Monthly Operations Summary, State-Federal San Luis Joint-Use Facilities
1994**

(In acre-feet except as noted)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Check 12													
State	189,836	85,530	87,102	-14,538	6,577	-9,561	72,694	173,373	186,904	153,852	197,561	224,522	1,353,852
Federal	9,227	9,778	11,840	16,044	16,815	12,697	13,264	15,163	10,522	5,710	4,204	4,927	130,191
Total	199,063	95,308	98,942	1,506	23,392	3,136	85,958	188,536	197,426	159,562	201,765	229,449	1,484,043
O'Neill P-G Plant Pumping													
State	0	0	0	0	0	0	0	0	0	0	0	0	0
Federal	110,293	150,573	53,838	26,231	3,768	0	1,300	24,884	115,503	45,019	107,539	200,028	838,976
Total	110,293	150,573	53,838	26,231	3,768	0	1,300	24,884	115,503	45,019	107,539	200,028	838,976
Generation Federal	336	0	3,579	16,507	23,907	107,424	65,455	46,402	5,996	2,426	1,741	0	273,773
O'Neill Forebay Storage*													
State	119,880	73,385	63,166	64,137	61,660	62,124	55,134	5,025	-2,374	-5,288	-19,462	-26,564	---
Federal	-68,460	-28,985	-16,697	-14,370	-20,745	-11,691	-8,271	44,263	49,105	51,993	62,045	72,718	---
Total	51,420	44,400	46,469	49,767	40,915	50,433	46,863	49,288	46,731	46,705	42,583	46,154	---
San Luis Reservoir Storage*													
State	1,071,679	1,070,541	1,053,827	936,902	828,003	568,701	369,386	294,680	399,342	400,817	544,599	709,001	---
Federal	959,461	960,472	943,592	855,291	742,060	447,822	118,820	3,574	91,579	217,135	313,824	487,574	---
Total	2,031,140	2,031,013	1,997,419	1,792,193	1,570,063	1,016,523	488,206	298,254	490,921	617,952	858,423	1,196,575	---
Gianelli P-G Plant Pumping													
State	5,838	2,006	10,159	0	0	0	0	30,358	121,110	6,769	150,066	186,360	512,666
Federal	49,186	2,015	2,669	0	0	0	0	11,153	114,233	136,626	108,966	175,791	600,639
Total	55,024	4,021	12,828	0	0	0	0	41,511	235,343	143,395	259,032	362,151	1,113,305
Generation													
State	0	0	25,596	116,986	108,541	261,262	204,037	105,173	10,588	0	0	5,089	837,272
Federal	0	0	12,220	84,894	110,505	283,692	319,289	112,966	8,356	1,982	0	0	933,904
Total	0	0	37,816	201,880	219,046	544,954	523,326	218,139	18,944	1,982	0	5,089	1,771,176
Pacheco Tunnel Federal	6,855	5,341	6,283	3,457	2,434	12,149	13,577	14,068	13,078	8,360	7,135	9,148	101,885
Dos Amigos P.P. Pumping													
State	145,614	151,617	117,330	156,407	185,725	272,428	338,855	217,256	97,633	63,793	55,251	58,726	1,860,635
Federal	112,501	101,128	63,543	57,159	52,434	176,461	220,300	135,649	1,748	0	0	11,713	932,636
Total	258,115	252,745	180,873	213,566	238,159	448,889	559,155	352,905	99,381	63,793	55,251	70,439	2,793,271

*At end of month.

**Table 16. Pyramid Lake Monthly Operation
1994**

(in acre-feet except as noted)

Month	Water Surface Elevation (in feet)	Storage	Natural Inflow Storage Shares	Storage Change	Inflow			Outflow			Computed Losses (-) Gains (+)
					Project		Natural	Project		Natural	
					Castaic Powerplant Pumpback 1/	Warne Powerplant		Castaic Powerplant Generation	Deliveries	Stream Flow Release 2/	
Jan	2,574.32	165,194	828	4,895	41,583	56,122	1,527	91,611	0	1,585	-1,141
Feb	2,572.44	162,822	2,719	-2,372	46,518	42,429	4,978	91,297	0	3,087	-1,913
Mar	2,574.04	164,839	2,103	2,017	55,858	49,267	3,599	99,672	1	4,215	-2,819
Apr	2,569.86	159,604	-456	-5,235	24,583	40,026	1,963	65,483	1	4,522	-1,801
May	2,575.31	166,451	- 1,005	6,847	43,261	53,625	1,333	86,806	2	1,882	-2,682
Jun	2,570.17	159,989	-1,401	-6,462	71,006	36,472	679	111,486	4	1,075	-2,054
Jul	2,568.26	157,630	-2,167	-2,359	47,099	63,958	447	110,392	4	1,213	-2,254
Aug	2,573.42	164,056	-3,012	6,426	57,950	39,488	369	87,382	4	1,214	-2,781
Sep	2,570.20	160,026	-3,607	-4,030	63,917	11,054	404	77,116	4	999	-1,286
Oct	2,570.83	160,809	-4,200	783	52,416	12,253	621	64,067	2	1,214	776
Nov	2,568.34	157,728	-4,614	-3,081	31,808	15,132	745	49,410	1	1,159	-196
Dec	2,569.78	159,505	-4,040	1,777	2,415	5,106	883	6,523	0	309	205
Total	---	---	---	-794	538,414	424,932	17,548	941,245	23	22,474	-17,946

1/ Pumpback by Los Angeles Department of Water and Power (LADWP) from Elderberry Forebay through Castaic powerplant.

2/ Portions of these amounts are used to satisfy fishery enhancement agreement.

**Table 17. Elderberry Forebay Monthly Operation
1994**

(in acre-feet except as noted)

Month	Water Surface Elevation (in feet)	Total Storage	Storage Change	Inflow		Outflow			Computed Losses (-) Gains (+)
				Castaic Powerplant Generation	Natural	Castaic Powerplant Pumpback 1/	To Castaic Lake		
							Natural	Project	
Jan	1521.38	24,095	2,222	91,611	323	41,583	323	47,353	-453
Feb	1517.44	22,430	-1,665	91,297	925	46,518	925	46,105	-339
Mar	1508.25	18,819	-3,611	99,672	600	55,858	600	47,332	-93
Apr	1522.81	24,715	5,896	65,483	316	24,583	316	35,053	49
May	1510.13	19,530	-5,185	86,806	118	43,261	118	49,169	439
Jun	1520.16	23,573	4,043	111,486	4	71,006	4	36,163	-274
Jul	1529.28	27,620	4,047	110,392	0	47,099	0	59,616	370
Aug	1512.76	20,546	-7,074	87,382	0	57,950	0	36,535	29
Sep	1525.80	26,038	5,492	77,116	0	63,917	0	7,649	-58
Oct	1526.64	26,415	377	64,067	0	52,416	0	9,555	-1,719
Nov	1501.74	16,454	-9,961	49,410	0	31,808	0	26,134	-1,429
Dec	1455.58	5,077	-11,377	6,523	24	2,415	24	15,389	-96
Total	- - -	- - -	-16,796	941,245	2,310	538,414	2,310	416,053	-3,574

1/ Pumpback by Los Angeles Department of Water and Power (LADWP) through Castaic Powerplant.

**Table 18. Castaic Lake Monthly Operation
1994**

(in acre-feet except as noted)

Month	Water Surface Elevation (in feet)	Total Storage 1/	Natural Inflow Storage Shares	Storage Change	Inflow			Outflow		Computed Losses (-) Gains (+)
					From Elderberry Forebay		Natural	Project Deliveries	Released to Castaic Lagoon	
					Natural	Project				
Jan	1,476.47	244,120	905	18,374	323	47,353	357	28,489	351	-819
Feb	1,492.47	275,624	2,945	31,504	925	46,105	1,115	15,999	0	-642
Mar	1,501.80	294,981	4,121	19,357	600	47,332	576	30,453	0	1,302
Apr	1,493.60	277,927	1,367	-17,054	316	35,053	377	48,813	3,447	-540
May	1,497.89	286,775	216	8,848	118	49,169	281	39,447	1,550	277
Jun	1,482.06	254,893	300	-31,882	4	36,163	80	67,580	0	-549
Jul	1,488.52	267,659	0	12,766	0	59,616	15	45,924	425	-516
Aug	1,487.86	266,339	3	-1,320	0	36,535	3	37,592	422	156
Sep	1,472.50	236,622	9	-29,717	0	7,649	6	36,859	0	-513
Oct	1,450.60	197,435	0	-39,187	0	9,555	55	48,295	453	-49
Nov	1,440.25	180,235	101	-17,200	0	26,134	101	42,711	0	-724
Dec	1,418.79	147,127	0	-33,108	24	15,389	130	49,637	0	986
Total	---	---	---	-78,619	2,310	416,053	3,096	491,799	6,648	-1,631

1/ At end of month.

**Table 19. Castaic Lagoon Monthly Operation
1994**

(in acre-feet except as noted)

Month	Water Surface Elevation (in feet)	Total Storage	Storage Change	Inflow	Natural Outflow		Deliveries to Recreation	Computed Losses (-) Gains (+)
					Release from Castaic Afterbay			
					Surface	Sub-Surface		
Jan	1135.67	5,597	-122	351	210	186	77	0
Feb	1135.20	5,505	-92	0	0	53	39	0
Mar	1134.76	5,420	-85	0	0	7	78	0
Apr	1136.35	5,731	311	3,447	2,979	90	67	0
May	1135.86	5,634	-97	1,550	1,479	93	75	0
Jun	1134.74	5,416	-218	0	0	58	160	0
Jul	1135.39	5,542	126	425	0	152	147	0
Aug	1135.93	5,648	106	422	0	136	180	0
Sep	1134.58	5,385	-263	0	0	117	146	0
Oct	1135.23	5,511	126	453	0	228	99	0
Nov	1134.06	5,285	-226	0	0	164	62	0
Dec	1133.15	5,111	-174	0	0	128	46	0
Total	---	---	-608	6,648	4,668	1,412	1,176	0

Table 20. Silverwood Lake Monthly Operation
1994

(in acre-feet except as noted)

Month	Water Surface Elevation (in feet)	Storage	Natural Inflow Storage Shares	Storage Change	Inflow		Outflow					Computed Losses (-) Gains (+)	Total Natural Inflow Released 1/	Appropriated Water From Houston Crk. To CLAWA
					Natural	Project	San Bernardino Tunnel	Project Deliveries			Natural Inflow to Mojave River			
								Recreation	CLAWA	Mojave Water Agency				
Jan	3,353.09	73,118	3,799	14,388	205	23,000	12,873	2	67	0	17	4,142	291	0
Feb	3,345.60	66,100	3,931	-7,018	2,069	1,210	9,670	1	55	819	634	882	1,613	324
Mar	3,333.47	55,531	4,886	-10,569	1,074	6,130	18,190	4	55	0	13	489	52	67
Apr	3,354.83	71,911	4,311	16,380	520	52,770	36,644	3	42	0	12	-209	1,095	0
May	3,349.15	69,379	3,460	-2,532	284	52,970	57,264	6	71	0	13	1,568	1,135	0
Jun	3,339.81	60,935	2,713	-8,444	76	61,630	70,830	10	131	0	13	834	823	0
Jul	3,351.21	71,321	1,751	10,386	2	70,870	60,249	11	164	0	13	-49	964	0
Aug	3,348.38	68,660	1,006	-2,661	0	33,640	38,505	16	169	0	12	2,401	745	0
Sep	3,347.88	68,196	643	-464	0	34,470	33,523	11	161	0	12	-1,227	363	0
Oct	3,347.80	68,122	-78	-74	10	20,230	20,109	6	99	0	13	-87	236	0
Nov	3,349.59	69,791	198	1,669	39	15,981	15,006	2	97	0	12	766	12	0
Dec	3,349.74	69,932	401	141	232	21,254	21,054	1	82	0	12	-196	12	17
Total	---	---	---	11,202	4,511	394,155	393,917	73	1,193	819	776	9,314	7,341	408

1/ Total releases made from Mojave Siphon to Las Flores Ranch Co., in exchange for natural inflow stored in lake, and from Silverwood Lake to Mojave River from outlet for Mojave W.A. The difference between this total column and the natural inflow released to Mojave River equals the Las Flores Ranch exchange.

**Table 21. Lake Perris Monthly Operation
1994**

(in acre-feet except as noted)

Month	Water Surface Elevation (in feet)	Total Storage	Storage Change	Inflow	Outflow (Deliveries)	Computed Losses (-) Gains (+)
Jan	1,585.15	120,372	-225	616	408	-433
Feb	1,584.00	117,799	-2,573	731	1/ 2,661	-643
Mar	1,583.03	115,645	-2,154	582	2/ 3,294	558
Apr	1,582.75	115,026	-619	1,448	736	-1,331
May	1,582.37	114,188	-838	1,253	378	-1,713
Jun	1,582.02	113,418	-770	696	388	-1,078
Jul	1,581.41	112,080	-1,338	0	396	-942
Aug	1,580.90	110,966	-1,114	785	395	-1,504
Sep	1,580.57	110,247	-719	624	384	-959
Oct	1,580.75	110,639	392	1,746	368	-986
Nov	1,580.42	109,921	-718	1,336	349	-1,705
Dec	1,580.25	109,552	-369	152	359	-162
Total	---	---	-11,045	9,969	10,116	-10,898

1/ 2,297 acre-feet pumped back to Box Springs turnout.

2/ 2,737 acre-feet pumped back to Box Springs turnout.

Table 22a. Summary of Governor Edmund G. Brown California Aqueduct Operation

1994

(in acre-feet)

Description	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
DELTA FIELD DIVISION	Note: North Bay Aqueduct, South Bay Aqueduct, and Lake Del Valle are not within the Edmond G. Brown California Aqueduct, they are shown here for completeness.												
North Bay Aqueduct													
Pumped at Barker Slough Pumping Plant	2,548	2,101	2,845	3,460	3,847	5,237	4,254	4,592	4,124	4,484	2,618	2,849	42,959
Deliveries (Travis & Fairfield/Vacaville)	697	550	1,240	867	1,173	2,470	1,623	1,466	354	260	147	602	11,449
Pumped at Cordelia Pumping Plant	1,678	1,459	1,517	2,328	2,472	2,529	2,421	2,919	2,840	2,046	1,901	2,217	26,327
Deliveries (Benicia, Vallejo, A.C. 1&2, & Napa)	1,678	1,459	1,523	2,328	2,472	2,529	2,421	2,919	2,840	2,046	1,901	2,217	26,333
Delivery to Spillway (Cordelia Reservoir)	0	0	6	0	0	0	0	0	1,140	2,471	780	0	4,397
Computed Losses (-), Gains (+)	-173	-92	-82	-265	-202	-238	-210	-207	210	293	210	-30	-786
California Aqueduct													
Pumped at Banks													
Pumping Plant	212,581	106,456	115,070	19,592	43,206	19,187	103,969	209,597	214,716	169,702	211,585	240,452	1,666,113
Pumped at South Bay Pumping Plant	9,227	9,778	11,840	16,044	16,815	12,697	13,264	15,163	10,522	5,710	4,204	4,927	130,191
Delivered to Contracting Agencies	111	133	146	247	498	713	576	849	361	364	25	19	4,042
Inflow Into Aqueduct	0	0	0	0	0	0	0	0	0	0	0	0	0
Change in Storage	160	-1,140	1,119	-231	90	543	330	-360	842	-862	402	-72	821
Outflow at Check 12	199,063	95,308	98,942	1,506	23,392	3,136	85,958	188,536	197,426	159,562	201,765	229,449	1,484,043
Computed Losses (-), Gains (+)	-4,020	-2,377	-3,023	-2,026	-2,411	-2,098	-3,841	-5,409	-5,565	-4,928	-5,189	-6,129	-47,016
South Bay Aqueduct													
Pumped at South Bay Pumping Plant	9,227	9,778	11,840	16,044	16,815	12,697	13,264	15,163	10,522	5,710	4,204	4,927	130,191
Inflow from Lake Del Valle	0	184	0	0	0	0	544	73	3,196	4,708	3,542	529	12,776
Outflow (Pumped into Lake Del Valle)	0	1,056	1,424	4,400	5,585	704	0	0	0	0	0	0	13,169
Delivered to Contracting Agencies	9,217	8,896	10,406	11,626	11,216	11,983	13,741	15,223	13,708	10,398	7,736	5,446	129,596
Computed Losses (-), Gains (+)	-10	-10	-10	-18	-14	-10	-67	-13	-10	-20	-10	-10	-202
Lake Del Valle Operation:													
Natural inflow	225	1,622	467	210	297	-3	-86	-12	146	-27	168	133	3,140
Inflow from South Bay Aqueduct	0	1,056	1,424	4,400	5,585	704	0	0	0	0	0	0	13,169
Outflows to Arroyo Valle & S.B. Aqueduct	0	184	0	0	0	0	544	73	3,196	4,708	3,542	529	12,776
Delivered to EBRP District	5	4	7	9	9	21	25	25	19	8	15	21	168
End-of-Month Storage (State)	25,100	27,551	29,308	33,742	39,379	39,653	38,571	38,005	34,599	29,637	26,181	25,737	---
Change in Storage	174	2,451	1,757	4,434	5,637	274	-1,082	-566	-3,406	-4,962	-3,456	-444	811
Evaporation Losses	-46	-39	-127	-167	-236	-406	-427	-456	-337	-219	-67	-27	-2,554
SAN LUIS FIELD DIVISION													
O'Neill Forebay Operation													
End-of-Month Storage	51,420	44,400	46,469	49,767	40,915	50,433	46,863	49,288	46,731	46,705	42,583	46,154	---
Inflow, California Aqueduct	199,063	95,308	98,942	1,506	23,392	3,136	85,958	188,536	197,426	159,562	201,765	229,449	1,484,043
Inflow, O'Neill P.- G. Plant	110,293	150,573	53,838	26,231	3,768	0	1,300	24,884	115,503	45,019	107,539	200,028	838,976
Inflow, Gianelli P.- G. Plant	0	0	37,816	201,880	219,046	544,954	523,326	218,139	18,944	1,982	0	5,089	1,771,176
Pump in	0	0	0	71	101	104	103	101	75	133	105	86	879
Delivered to Dept. of Fish and Game (State)	22	22	54	37	59	47	41	62	26	49	19	22	460
Delivered to Dept. of Fish and Game (Fed.)	18	18	44	31	47	39	33	51	21	40	17	17	376
Delivered to Dept. of Parks & Rec. (Fed.)	0	0	0	0	0	0	0	0	0	0	0	53	53
Delivered to Dept. of Parks & Rec. (State)	0	0	0	0	0	0	0	0	0	0	0	68	68
Delivered to Federal Customers	729	1,479	714	1,027	875	1,894	2,945	2,823	780	349	87	93	13,795
Outflow, O'Neill P.- G. Plant	336	0	3,579	16,507	23,907	107,424	65,455	46,402	5,996	2,426	1,741	0	273,773
Outflow, Gianelli P.- G. Plant	55,024	4,021	12,828	0	0	0	0	41,511	235,343	143,395	259,032	362,151	1,113,305
Outflow, Dos Amigos P.P.	258,115	252,745	180,873	213,566	238,159	448,889	559,155	352,905	99,381	63,793	55,251	70,439	2,793,271
Change in Storage	1,600	-7,020	2,069	3,298	-8,852	9,518	-3,570	2,425	-2,557	-26	-4,122	3,571	-3,666
Computed Losses (-), Gains (+)	6,488	5,384	9,565	4,778	7,888	19,617	13,372	14,519	7,042	3,330	2,616	1,762	96,361
San Luis Reservoir Operation													
State End-of-Month Storage	1,066,980	1,065,844	1,049,169	932,895	823,998	563,029	363,867	289,162	393,825	397,318	529,783	694,184	---
Total End-of-Month Storage	2,031,140	2,031,013	1,997,419	1,792,193	1,570,063	1,016,523	488,206	298,254	490,921	617,952	858,423	1,196,575	---
Inflow, Gianelli P.- G. Plant	55,024	4,021	12,828	0	0	0	0	41,511	235,343	143,395	259,032	362,151	1,113,305
Outflow, Gianelli P.- G. Plant	0	0	37,816	201,880	219,046	544,954	523,326	218,139	18,944	1,982	0	5,089	1,771,176
Delivered to Dept of Parks & Rec. (Fed.)	0	0	0	0	0	0	0	0	0	0	0	9	9
Delivered to Dept of Parks & Rec. (State)	0	0	0	0	0	0	0	0	0	0	0	9	9
Pacheco Tunnel Diversion	6,855	5,341	6,283	3,457	2,434	12,149	13,577	14,068	13,078	8,360	7,135	9,148	101,885
Change in Storage (Total)	45,591	-127	-33,594	-205,226	-222,130	-553,540	-528,317	-189,952	192,667	127,031	240,471	338,152	-788,974
Computed Losses (-), Gains (+)	-2,578	1,193	-2,323	111	-650	3,563	8,586	744	-10,654	-6,022	-11,426	-9,744	-29,200

Note: Monthly values may not add up to totals shown because of rounding.

Table 22b. Summary of Governor Edmund G. Brown California Aqueduct Operation (cont.)
1994
(in acre-feet)

Description	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
SAN LUIS FIELD DIVISION (Cont.)													
California Aqueduct (Pools 14 thru 21)													
Inflow, Dos Amigos P.P.(State)	145,614	151,617	117,330	156,407	185,725	272,428	338,855	217,256	97,633	63,793	55,251	58,726	1,860,635
Inflow, Dos Amigos P.P.(Federal)	112,501	101,128	63,543	57,159	52,434	176,461	220,300	135,649	1,748	0	0	11,713	932,636
Total Inflow, Dos Amigos P.P.	258,115	252,745	180,873	213,566	238,159	448,889	559,155	352,905	99,381	63,793	55,251	70,439	2,793,271
Flow into Aqueduct	309	74	719	9,587	12,849	8,734	8,093	10,529	9,823	17,828	10,597	10,248	99,390
Delivered to Dept. of Fish and Game (State)	43	9	0	30	1	0	31	9	8	25	20	4	180
Delivered to Dept. of Fish and Game (Fed.)	35	8	0	24	1	0	26	7	7	21	16	3	148
Delivered to Federal Customers 1/	110,599	101,796	49,344	55,457	58,952	167,838	201,879	127,492	19,769	14,916	15,756	22,555	946,353
Outflow, Check 21 (State)	136,152	142,775	122,787	157,752	179,474	267,007	339,888	219,195	84,100	56,429	43,590	50,503	1,799,652
Outflow, Check 21 (Federal)	2,427	2,744	358	5,631	5,946	9,104	16,641	5,410	0	2,630	3,770	2,971	57,632
Change in Storage	805	-732	915	-883	-77	649	44	286	-740	367	-819	342	157
Computed Losses (-), Gains (+)	-8,363	-6,219	-8,188	-5,142	-6,711	-13,025	-8,739	-11,035	-6,060	-7,233	-3,515	-4,309	-88,539
SAN JOAQUIN FIELD DIVISION													
California Aqueduct, Check 21 to Buena Vista Pumping Plant													
Inflow, Check 21 (state)	136,152	142,775	122,787	157,752	179,474	267,007	339,888	219,195	84,100	56,429	43,590	50,503	1,799,652
Inflow, Check 21 (Federal)	2,427	2,744	358	5,631	5,946	9,104	16,641	5,410	0	2,630	3,770	2,971	57,632
Total Inflow, Check 21	138,579	145,519	123,145	163,383	185,420	276,111	356,529	224,605	84,100	59,059	47,360	53,474	1,857,284
West Kern Trade, Pumpback	0	0	0	0	0	0	0	0	0	0	-377	-2,319	-2,696
Delivered to Contracting State Agencies	37,943	83,583	37,749	29,641	30,747	98,143	133,998	83,139	14,364	7,429	4,901	16,935	578,572
Delivered to Federal Customers	2,427	2,744	358	5,631	5,946	9,104	8,923	3,866	0	2,630	3,770	2,971	48,370
Kern Water Bank Preconsol. Return	0	0	0	0	0	0	0	0	0	0	0	0	0
Outflow, Buena Vista P.P.	91,734	51,659	73,900	111,818	128,556	138,260	181,245	115,295	62,869	45,756	37,446	33,324	1,071,862
Coastal Br. Diversion	1,699	3,375	6,975	10,535	12,019	18,187	21,505	15,122	5,558	4,433	803	1,003	101,214
Change in Storage	-237	-82	-246	-282	399	-417	611	-416	731	-709	45	446	-158
Computed Losses (-), Gains (+)	-5,013	-4,240	-4,409	-6,040	-7,753	-12,834	-10,248	-7,599	-578	480	-773	-1,114	-60,120
California Aqueduct, Buena Vista P.P. to Teerink P.P.													
Inflow, Buena Vista P.P.	91,734	51,659	73,900	111,818	128,556	138,260	181,245	115,295	62,869	45,756	37,446	33,324	1,071,862
Delivered to Contracting State Agencies	3,327	6,585	12,136	9,048	7,037	21,296	26,773	18,124	4,751	2,075	1,376	1,450	113,978
W.R.M.W.S.D. Pumpback	0	0	0	0	0	0	0	0	0	0	0	0	0
Outflow, Teerink P.P.	89,516	45,819	62,061	103,361	123,396	118,892	158,512	99,639	59,664	44,296	36,410	32,037	973,603
Change in Storage	31	-376	172	205	-335	50	196	-222	125	73	-88	152	-17
Computed Losses (-), Gains (+)	1,140	369	469	796	1,542	1,978	4,236	2,246	1,671	688	252	315	15,702
California Aqueduct, John R. Teerink to Chrisman P.P.													
Inflow, Teerink P.P.	89,516	45,819	62,061	103,361	123,396	118,892	158,512	99,639	59,664	44,296	36,410	32,037	973,603
Delivered to Contracting State Agencies	579	1,268	1,695	2,908	3,280	5,523	6,255	3,679	2,017	860	706	741	29,511
Outflow, Chrisman P.P.	89,027	44,251	61,045	102,250	120,985	113,791	152,541	97,130	57,923	44,029	36,108	31,413	950,493
Change in Storage	-3	0	0	0	0	0	0	0	0	-3	-126	0	-131
Computed Losses (-), Gains (+)	87	-300	679	1,797	869	422	284	1,170	276	590	278	117	6,270
California Aqueduct, Chrisman P.P. to Edmonston P.P.													
Inflow, Chrisman P.P.	89,027	44,251	61,045	102,250	120,985	113,791	152,541	97,130	57,923	44,029	36,108	31,413	950,493
Delivered to Contracting State Agencies	336	43	266	879	2,017	2,785	3,705	3,014	1,724	1,360	515	244	16,888
Outflow From Edmonston P.P.	88,193	44,134	58,822	99,993	117,276	109,572	145,925	90,610	54,852	41,707	35,057	31,069	917,210
Change in Storage	-24	12	15	-55	13	-27	-1	71	40	-12	68	4	103
Computed Losses (-), Gains (+)	-522	-62	-1,942	-1,433	-1,679	-1,461	-2,912	-3,435	-1,307	-974	-468	-96	-16,292
Coastal Branch, California Aqueduct													
Inflow, Las Perillas P.P.	1,699	3,375	6,975	10,535	12,019	18,187	21,505	15,122	5,558	4,433	803	1,003	101,214
B.M.W.S.D. Pumpback	0	0	0	0	0	0	0	0	0	0	0	0	0
Delivered to Contracting State Agencies	1,609	3,091	6,417	9,698	11,070	16,197	19,608	14,281	5,113	3,979	873	763	92,699
Delivered to Federal Customers	0	0	0	0	0	0	0	0	0	0	0	0	0
Change in Storage	-1	-17	18	-14	1	-12	21	6	-12	2	-103	109	0
Computed Losses (-), Gains (+)	-91	-301	-540	-851	-948	-2,002	-1,876	-835	-457	-452	-33	-131	-8,515

1/ Includes 108 ac-ft of phase 1 non-chargeable refill water to WWD.

Table 22c. Summary of Governor Edmund G. Brown California Aqueduct Operation (cont.)

1994

(in acre-feet)

Description	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
SOUTHERN FIELD DIVISION													
Tehachapi Afterbay Operation													
Inflow from Edmonston P.P.	88,193	44,134	58,822	99,993	117,276	109,572	145,925	90,610	54,852	41,707	35,057	31,069	917,210
Outflow to West Branch	56,250	41,880	48,908	39,836	54,325	37,053	63,713	39,342	10,569	12,623	11,204	4,766	420,469
Outflow to East Branch	31,935	2,258	9,927	60,137	62,898	72,466	82,177	51,225	44,247	29,069	23,831	26,288	496,458
Change in Storage	3	1	-6	-5	9	3	-6	3	3	-9	3	2	1
Computed Losses (-), Gains (+)	-5	5	7	-25	-44	-50	-41	-40	-33	-24	-19	-13	-282
California Aqueduct, Tehachapi Afterbay to Pearblossom P.P.													
Inflow (Aqueduct)	31,935	2,258	9,927	60,137	62,898	72,466	82,177	51,225	44,247	29,069	23,831	26,288	496,458
Delivered to Contracting Agencies	1,725	1,701	3,565	5,432	6,099	7,867	8,331	8,401	6,260	4,513	3,339	2,835	60,068
Outflow, Pearblossom P.P.	28,785	1,860	6,738	52,652	53,741	61,371	70,149	39,917	35,125	22,584	19,453	22,328	414,703
Change in Storage	1,022	-938	156	266	-164	-493	631	-50	455	179	-351	170	883
Computed Losses (-), Gains (+)	-403	365	532	-1,787	-3,222	-3,721	-3,066	-2,957	-2,407	-1,793	-1,390	-955	-20,804
California Aqueduct, Pearblossom P.P. to Silverwood Lake													
Inflow, Pearblossom P.P.	28,785	1,860	6,738	52,652	53,741	61,371	70,149	39,917	35,125	22,584	19,453	22,328	414,703
Deliveries (Exchange of Natural Inflow)	0	0	0	0	0	0	294	3,696	2,712	2,980	2,957	2,795	15,434
Exchange of Natural Inflow (Los Flores T.O.)	274	979	39	1,083	1,122	810	951	733	351	223	0	0	6,565
Outflow to Silverwood Lake	23,000	1,210	6,130	52,770	52,970	61,630	70,870	33,640	34,470	20,230	15,981	21,254	394,155
Change in Storage	-613	-406	211	246	184	-108	25	186	46	-183	169	7	-236
Computed Losses (-), Gains (+)	-6,124	-77	-358	1,447	535	961	1,991	-1,662	2,454	666	-346	1,728	1,215
Silverwood Lake Operation													
Inflow, Project	23,000	1,210	6,130	52,770	52,970	61,630	70,870	33,640	34,470	20,230	15,981	21,254	394,155
Inflow, Natural	205	2,069	1,074	520	284	76	2	0	0	10	39	232	4,511
Delivered to Contracting Agencies	67	874	55	42	71	131	164	169	161	99	97	82	2,012
Recreation Deliveries	2	1	4	3	6	10	11	16	11	6	2	1	73
Outflow, Natural Inflow Released	17	634	13	12	13	13	13	12	12	13	12	12	776
Outflow, Project Water at San Bernardino Tunnel	12,873	9,670	18,190	36,644	57,264	70,830	60,249	38,505	33,523	20,109	15,006	21,054	393,917
Change in storage	14,388	-7,018	-10,569	16,380	-2,532	-8,444	10,386	-2,661	-464	-74	1,669	141	11,202
Computed Losses (-), Gains (+)	4,142	882	489	-209	1,568	834	-49	2,401	-1,227	-87	766	-196	9,314
California Aqueduct, Silverwood Lake to Lake Perris													
Inflow, San Bernardino Tunnel	12,873	9,670	18,190	36,644	57,264	70,830	60,249	38,505	33,523	20,109	15,006	21,054	393,917
Inflow, SBVMWD Pump-in at DC Afterbay	0	2,297	2,737	0	0	0	0	0	0	0	0	0	5,034
Delivered to Contracting Agencies	12,260	11,236	20,341	35,195	56,009	70,133	60,246	37,717	32,897	18,362	13,670	20,899	388,965
Outflow to Lake Perris	616	731	582	1,448	1,253	696	0	785	624	1,746	1,336	152	9,969
Change in Storage	-4	-1	2	-1	0	-2	0	0	0	-1	-1	2	-6
Operational Losses (-), Gains (+)	-1	-1	-2	-2	-2	-3	-3	-3	-2	-2	-1	-1	-23
Lake Perris Operation													
Inflow	616	731	582	1,448	1,253	696	0	785	624	1,746	1,336	152	9,969
Delivered to Contracting Agencies	389	355	548	710	362	339	342	339	328	339	331	343	4,725
Recreation Deliveries	19	9	9	26	16	49	54	56	56	29	18	16	357
Outflow (Pumpback)	0	2,297	2,737	0	0	0	0	0	0	0	0	0	5,034
Change in Storage	-225	-2,573	-2,154	-619	-838	-770	-1,338	-1,114	-719	392	-718	-369	-11,045
Computed Losses (-), Gains (+)	-433	-643	558	-1,331	-1,713	-1,078	-942	-1,504	-959	-986	-1,705	-162	-10,898

Table 22d. Summary of Governor Edmund G. Brown California Aqueduct Operation (cont.)

1994

(in acre-feet)

Description	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
SOUTHERN FIELD DIVISION (Cont.)													
West Branch California Aqueduct Tehachapi Afterbay to Oso P.P.													
Inflow	56,250	41,880	48,908	39,836	54,325	37,053	63,713	39,342	10,569	12,623	11,204	4,766	420,469
Outflow, Oso Pumping Plant	56,226	41,890	48,955	39,777	54,164	36,891	63,605	39,209	10,461	12,575	11,139	4,720	419,612
Change in Storage	7	5	-17	-15	28	8	-19	10	9	-26	8	6	4
Computed Losses (-), Gains (+)	-17	15	30	-74	-133	-154	-127	-123	-99	-74	-57	-40	-853
West Branch California Aqueduct Oso P.P. to Pyramid Lake													
Inflow, Oso P.P.	56,226	41,890	48,955	39,777	54,164	36,891	63,605	39,209	10,461	12,575	11,139	4,720	419,612
Outflow through William E. Warne P.P. to Pyramid Lake	56,122	42,429	49,267	40,026	53,625	36,472	63,958	39,488	11,054	12,253	15,132	5,106	424,932
Change in Storage	-268	165	-302	-254	511	134	-424	506	-506	351	-3,890	-370	-4,347
Operational Losses (-), Gains (+)	-372	704	10	-5	-28	-285	-71	785	87	29	103	16	973
Pyramid Lake Operation													
Inflow, Project	56,122	42,429	49,267	40,026	53,625	36,472	63,958	39,488	11,054	12,253	15,132	5,106	424,932
Inflow, Natural	1,527	4,978	3,599	1,963	1,333	679	447	369	404	621	745	883	17,548
Inflow, Pumpback from Elderberry Forebay	41,583	46,518	55,858	24,583	43,261	71,006	47,099	57,950	63,917	52,416	31,808	2,415	538,414
Deliveries (Fish Enhancement)	0	0	0	0	0	0	0	0	0	0	0	0	0
Deliveries	0	0	0	0	0	0	0	0	0	0	0	0	0
Delivered to Dept. of Parks and Rec. (State)	0	0	1	1	2	4	4	4	4	2	1	0	23
Outflow, Stream Release	1,585	3,087	4,215	4,522	1,882	1,075	1,213	1,214	999	1,214	1,159	309	22,474
Outflow, Angeles Tunnel	91,611	91,297	99,672	65,483	86,806	111,486	110,392	87,382	77,116	64,067	49,410	6,523	941,245
Change in Storage	4,895	-2,372	2,017	-5,235	6,847	-6,462	-2,359	6,426	-4,030	783	-3,081	1,777	-794
Computed Losses (-), Gains (+)	-1,141	-1,913	-2,819	-1,801	-2,682	-2,054	-2,254	-2,781	-1,286	776	-196	205	-17,946
Elderberry Forebay Operation													
Inflow, Project through Castaic P-G Plant	91,611	91,297	99,672	65,483	86,806	111,486	110,392	87,382	77,116	64,067	49,410	6,523	941,245
Inflow, Natural	323	925	600	316	118	4	0	0	0	0	0	24	2,310
Outflow, Pumpback to Pyramid Lake	41,583	46,518	55,858	24,583	43,261	71,006	47,099	57,950	63,917	52,416	31,808	2,415	538,414
Outflow, Project Water Released to Castaic Lake	47,676	47,030	47,932	35,369	49,287	36,167	59,616	36,535	7,649	9,555	26,134	15,413	418,363
Change in Storage	2,222	-1,665	-3,611	5,896	-5,185	4,043	4,047	-7,074	5,492	377	-9,961	-11,377	-16,796
Computed Losses (-), Gains (+)	-453	-339	-93	49	439	-274	370	29	-58	-1,719	-1,429	-96	-3,574
Castaic Lake Operation													
Inflow, From Elderberry Forebay	47,676	47,030	47,932	35,369	49,287	36,167	59,616	36,535	7,649	9,555	26,134	15,413	418,363
Inflow, Natural	357	1,115	576	377	281	80	15	3	6	55	101	130	3,096
Delivered to Contracting Agencies	28,489	15,999	30,453	48,813	39,447	67,580	45,924	37,592	36,859	48,295	42,711	49,637	491,799
Outflow, Castaic Afterbay	351	0	0	3,447	1,550	0	425	422	0	453	0	0	6,648
Change in Storage	18,374	31,504	19,357	-17,054	8,848	-31,882	12,766	-1,320	-29,717	-39,187	-17,200	-33,108	-78,619
Computed Losses (-), Gains (+)	-819	-642	1,302	-540	277	-549	-516	156	-513	-49	-724	986	-1,631
Castaic Lagoon Operation													
Inflow (Includes recreation inflow)	351	0	0	3,447	1,550	0	425	422	0	64	0	0	6,259
Inflow, Delivery to Recreation	0	0	0	0	0	0	0	0	0	1/ 389	0	0	389
Outflow	396	53	7	3,069	1,572	58	152	136	117	228	164	128	6,080
Deliveries to Recreation (State)	77	39	78	67	75	160	147	180	146	2/ 99	62	46	1,176
Change in Storage	-122	-92	-85	311	-97	-218	126	106	-263	126	-226	-174	-608
Computed Losses (-), Gains (+)	0	0	0	0	0	0	0	0	0	0	0	0	0

1/ Recreation water to the Lagoon released from Castaic Lake.

2/ Total recreation to the Lagoon includes this amount and the 389 ac-ft released from Castaic Lake for a total of 488 ac-ft.

Figure 1. Total Deliveries from SWP Facilities
Annual Totals

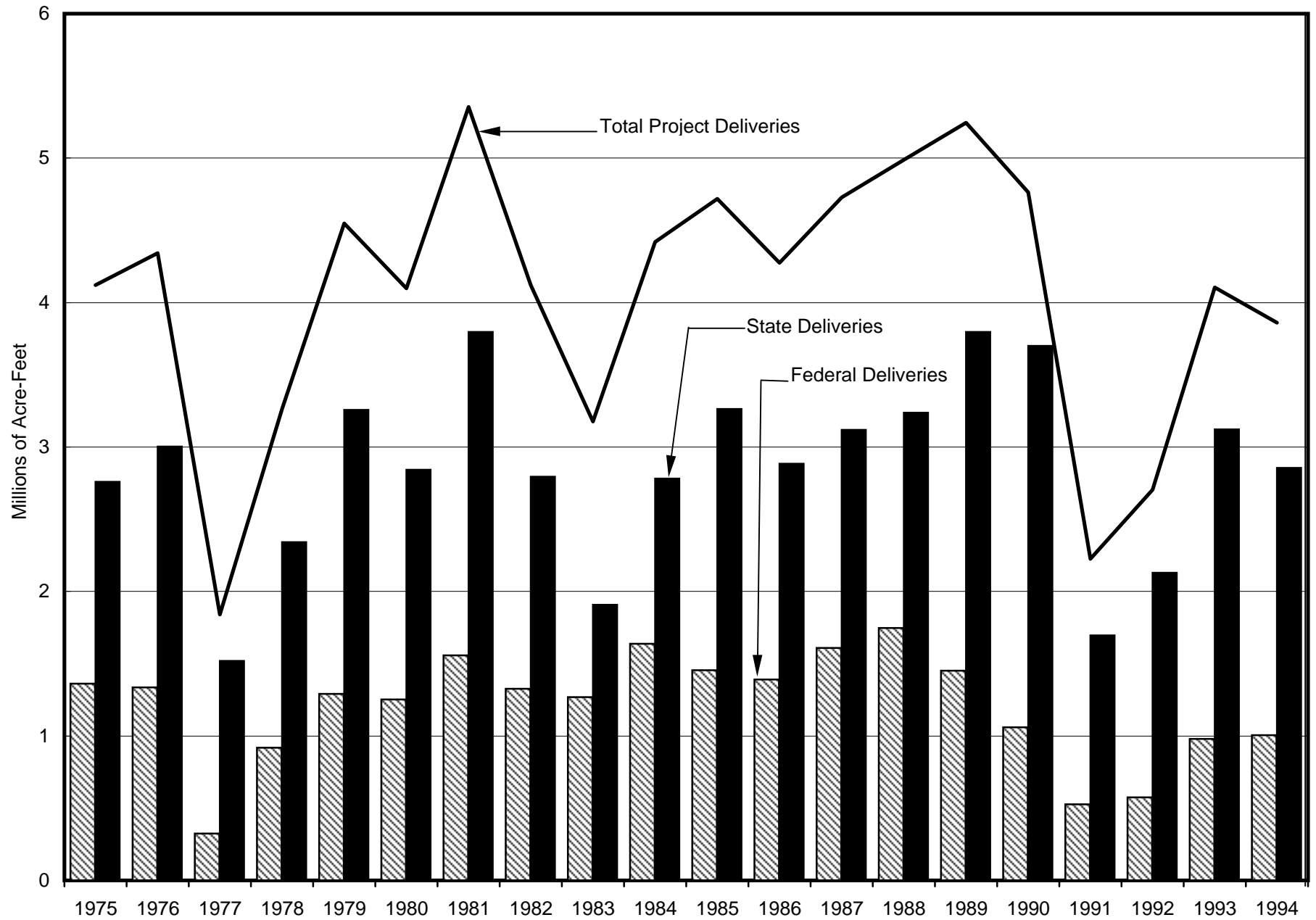
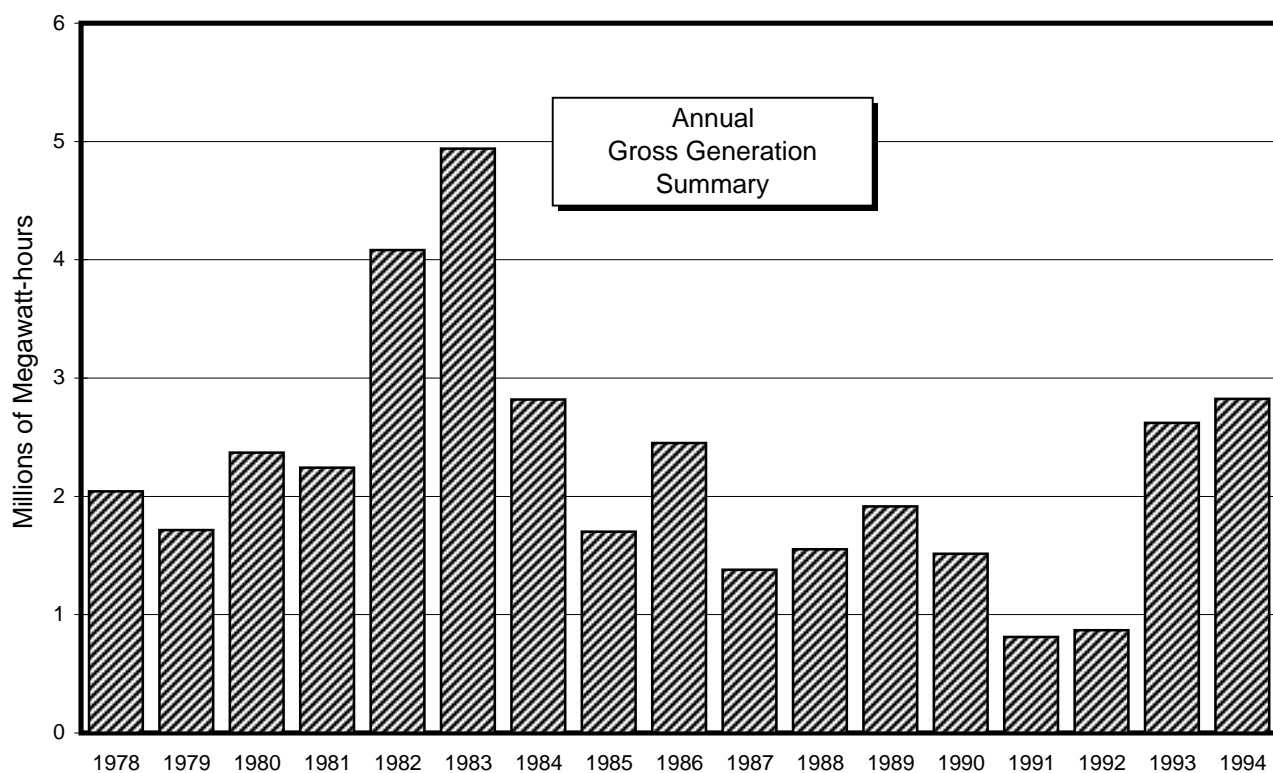
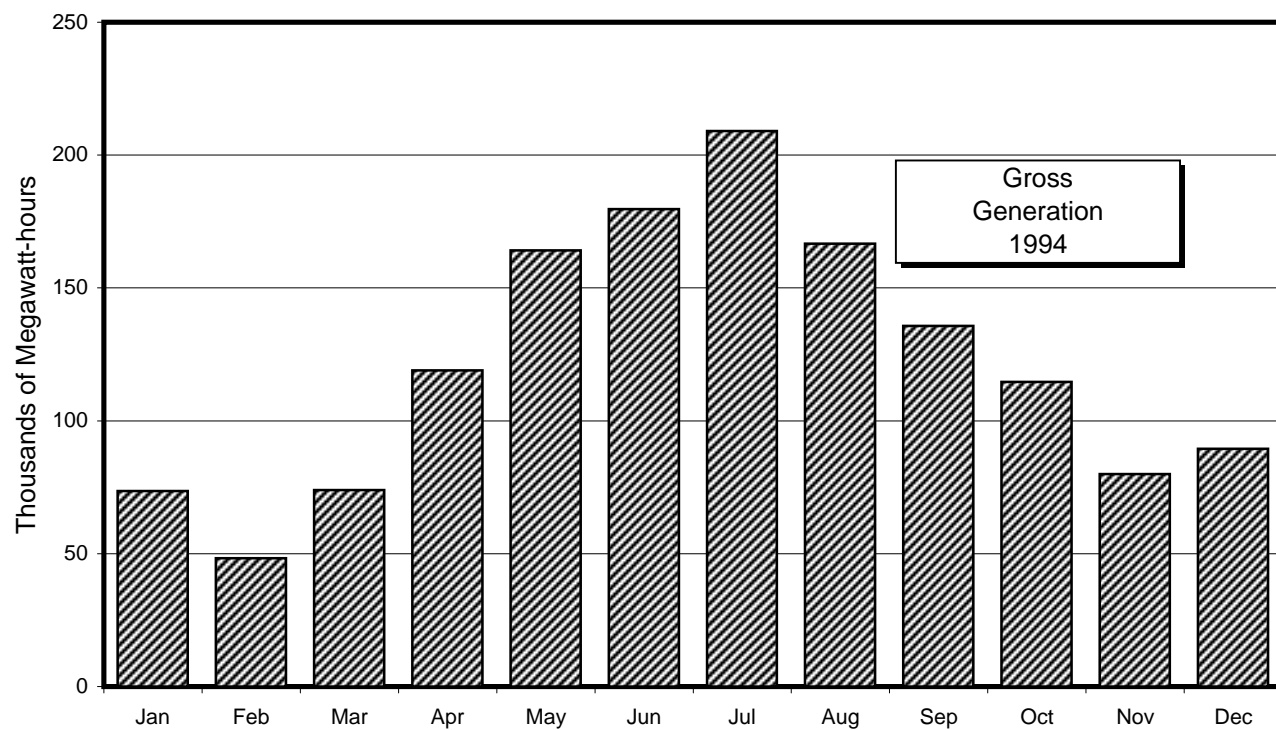
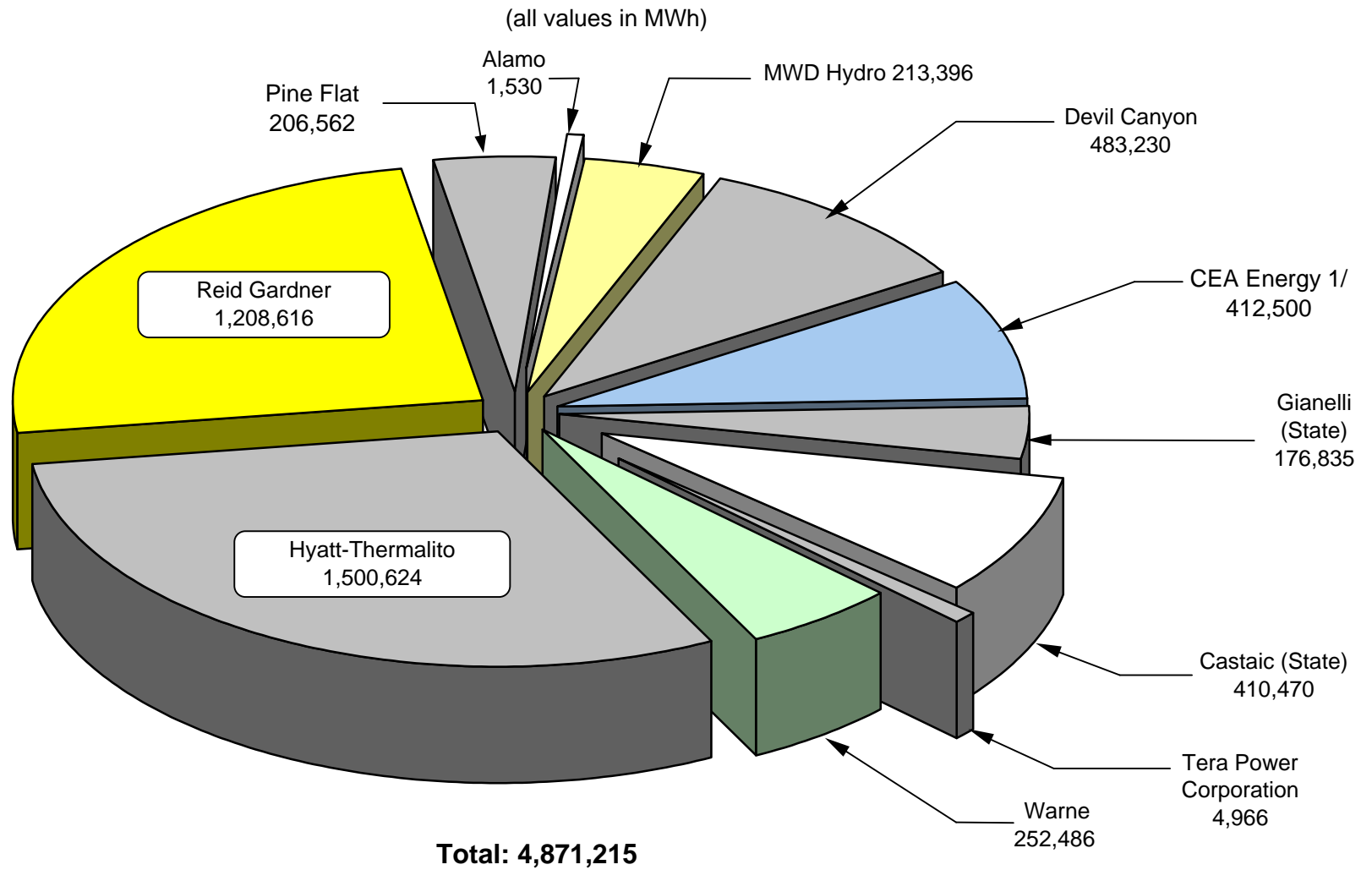


Figure 2. Operation of Edward Hyatt And Thermalito Powerplants



**Figure 3. SWP Energy Resources
1994**



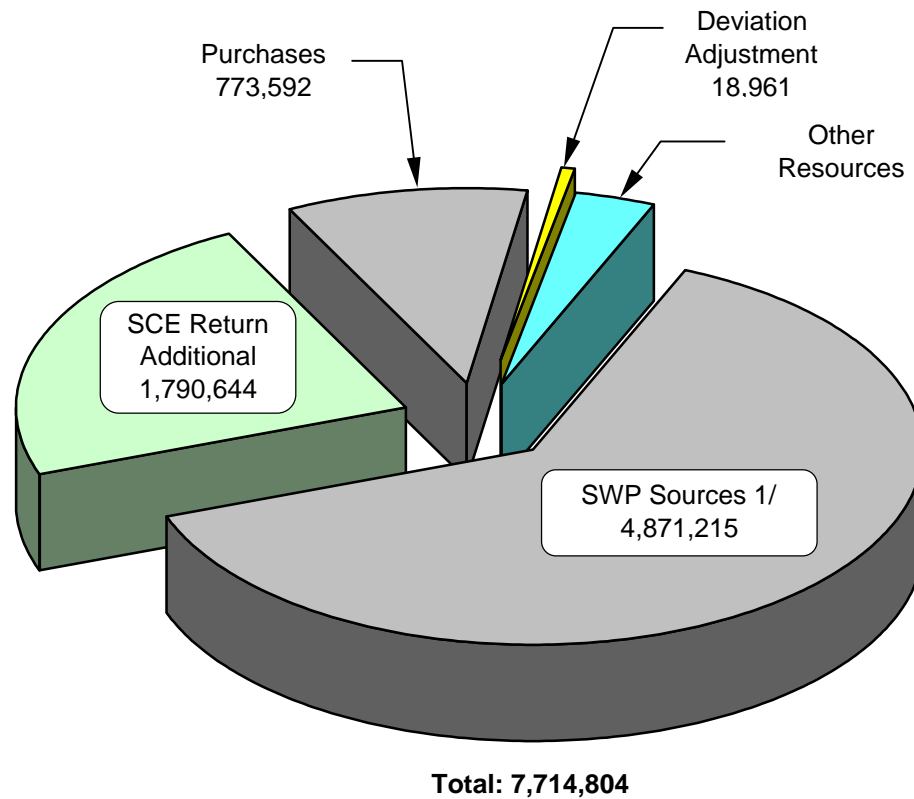
Note: Purchases, Other Sources, and SCE Return Additional are not shown here. All values are metered readings at plants and are not adjusted for transmission losses.

1/ Capacity Exchange Agreement energy from SWP system to Southern California Edison.

Figure 4. Energy Resources

1994

(all values in MWh)



1/ See Figure 3 for a breakdown of this source.

2/ Capacity Exchange Agreement energy from SWP system to Southern California Edison.

Purchases

Pacific Power & Light	613,795
Salt River Project	95,453
Southren California Edison	27,775
Bonneville Power Authority	21,855
Portland General Electric	10,109
Pacific Gas & Electric	3,005
L. A. Dept. of Water & Power	1,200
Enron Power Marketing, Inc.	400
	<hr/>
	773,592

Other Resources

Southern California Edison	247,736
Pacific Gas and Electric	7,044
L. A. Dept. of Water and Power	2,940
Western Area Mid Pacific	2,286
City of Vernon	386
	<hr/>
	260,392

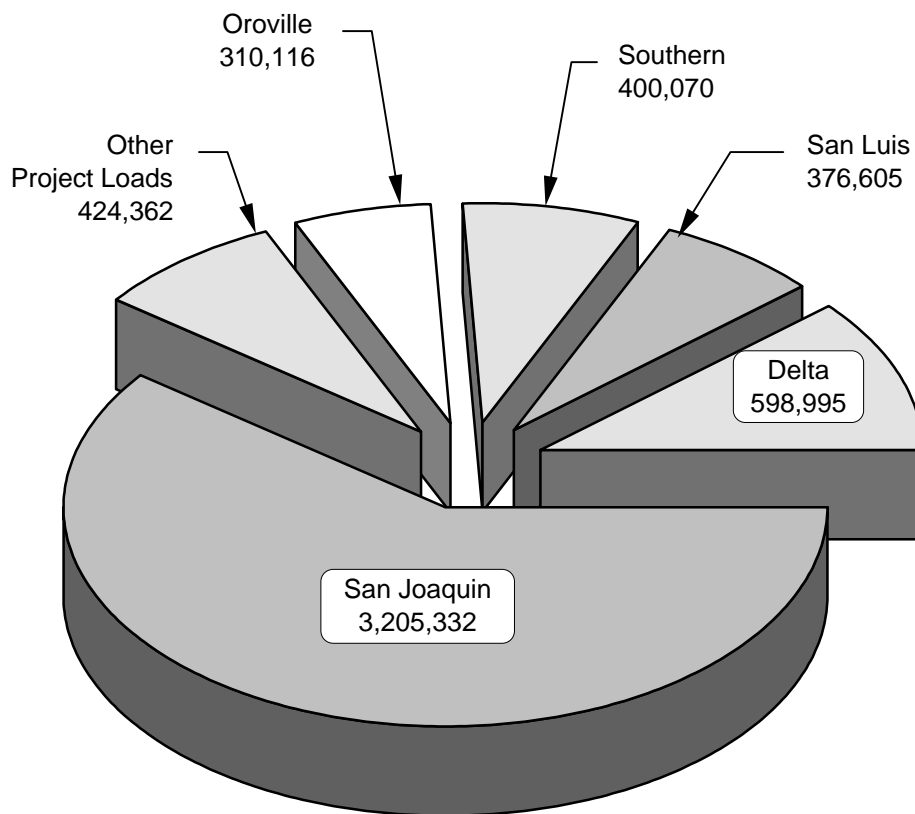
SCE Return Additional

Total Received from SCE	3,565,886
SCE Hyatt-Thermalito Entitlement	-664,586
SCE Devil Canyon Entitlement	-483,230
SCE Alamo Entitlement	-1,530
MWD Hydro Entitlement	-213,396
CEA Energy 2/	-412,500
	<hr/>
	1,790,644

Figure 5. SWP Energy Loads

1994

(all values in MWh)



Total: 5,315,480

Oroville Field Division

Hyatt-Thermalito Complex (Pump-back and Station Service)	310,116
	<hr/> 310,116

Delta Field Division

North Bay	17,322
South Bay	112,007
Del Valle	944
Banks	467,821
Bottle Rock (Station Service)	901
	<hr/> 598,995

San Luis Field Division

Gianelli	133,211
Dos Amigos	242,341
Pine Flat (Station Service)	1,053
	<hr/> 376,605

San Joaquin Field Division

Las Perillas	7,563
Badger Hill	19,905
Buena Vista	261,958
Teerink	262,975
Chrisman	589,415
Edmonston	2,063,516
	<hr/> 3,205,332

Southern Field Division

Oso	114,374
Pearblossom	284,949
Warne (Station Service)	747
	<hr/> 400,070

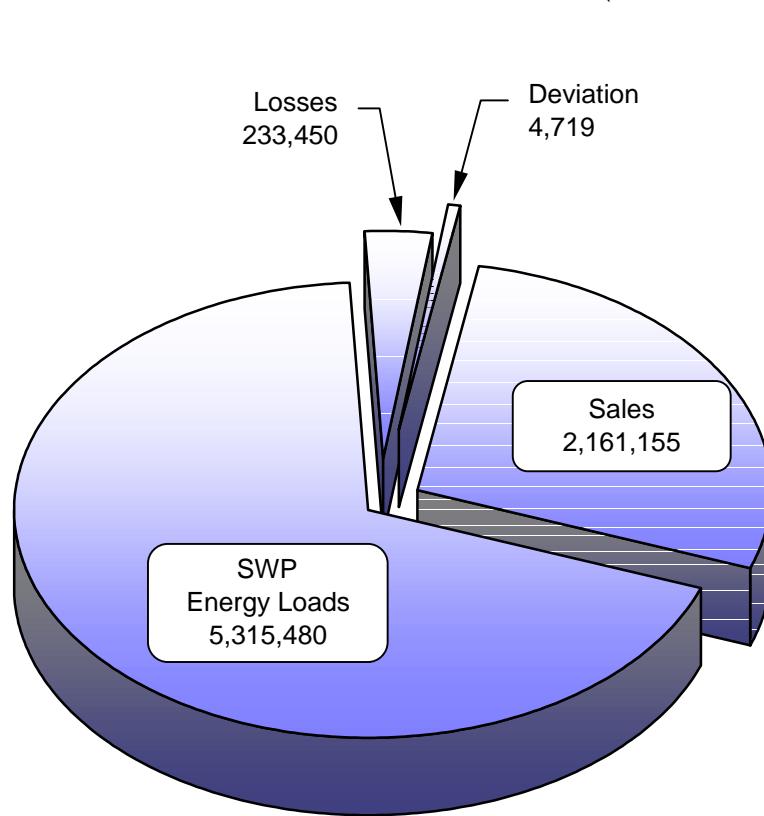
Other Project Loads

Southern California Edison	414,060
Pacific Gas and Electric (Emergency Service)	7,044
Nevada Power Authority	2,684
City of Vernon	386
South Bay Station Service	188
	<hr/> 424,362

Figure 6. Total Energy Loads

1994

(all values in MWh)



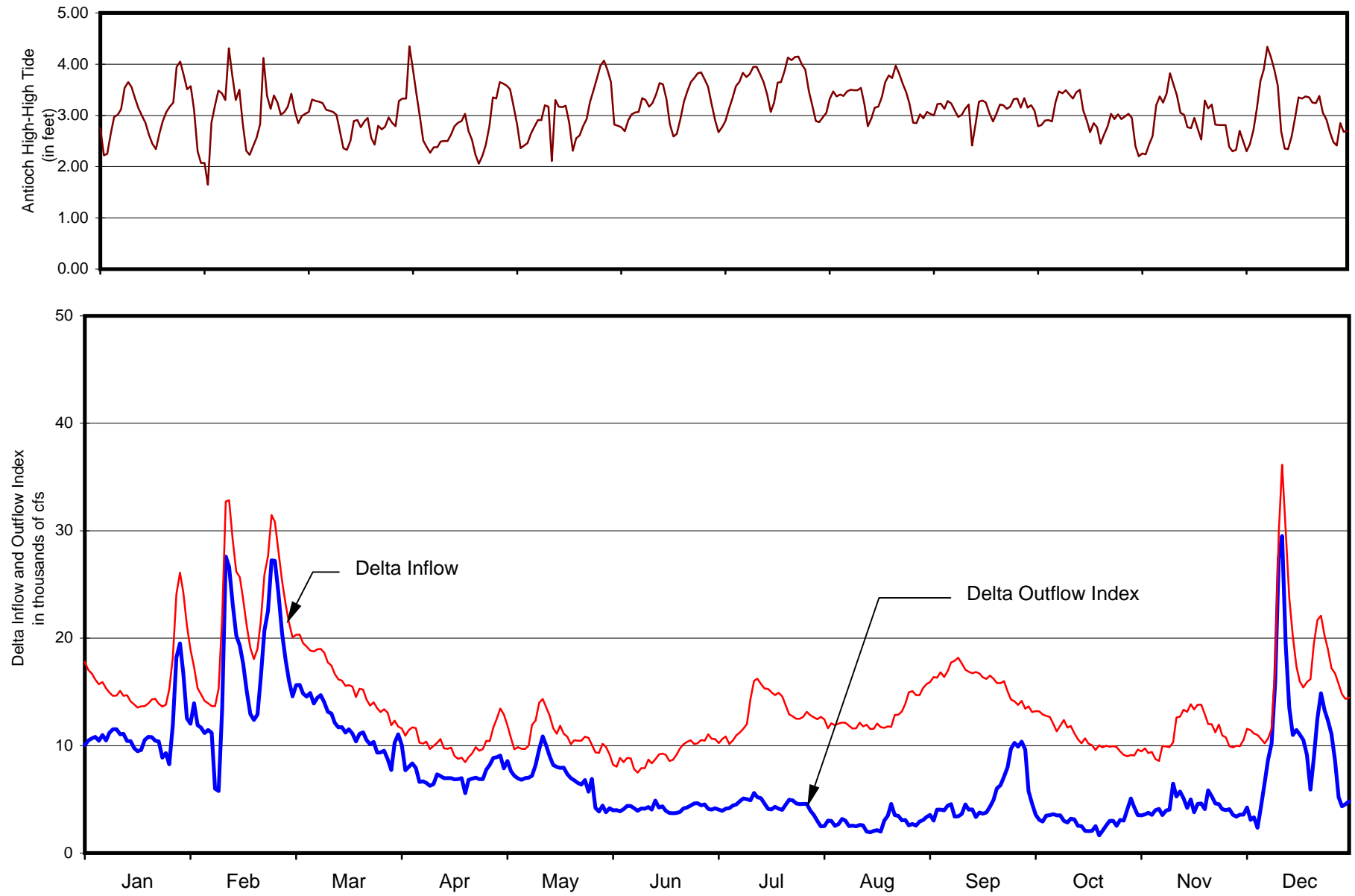
Sales

Sacramento Municipal Utility District	611,332
Modesto Irrigation District	187,998
Western Area Mid Pacific	159,336
Northern California Power Agency	153,289
City and County of San Francisco	140,275
Nevada Power	138,579
Pacific Power and Light	129,993
Louis Dreyfus Electric Power, Inc.	110,222
Enron Power Marketing	106,317
Bonneville Power Authority	89,930
Turlock Irrigation District	63,568
Seattle City Light	62,930
Portland General Electric	56,250
Lassen Municipal Utility District	51,482
Pacific Gas and Electric	44,900
Salt River Project	15,515
City of Vernon	12,998
City of Santa Clara	11,285
Southern California Edison	6,049
City of Riverside	5,902
City of Glendale	2,070
City of Burbank	590
City of Pasadena	345
	<hr/>
	2,161,155

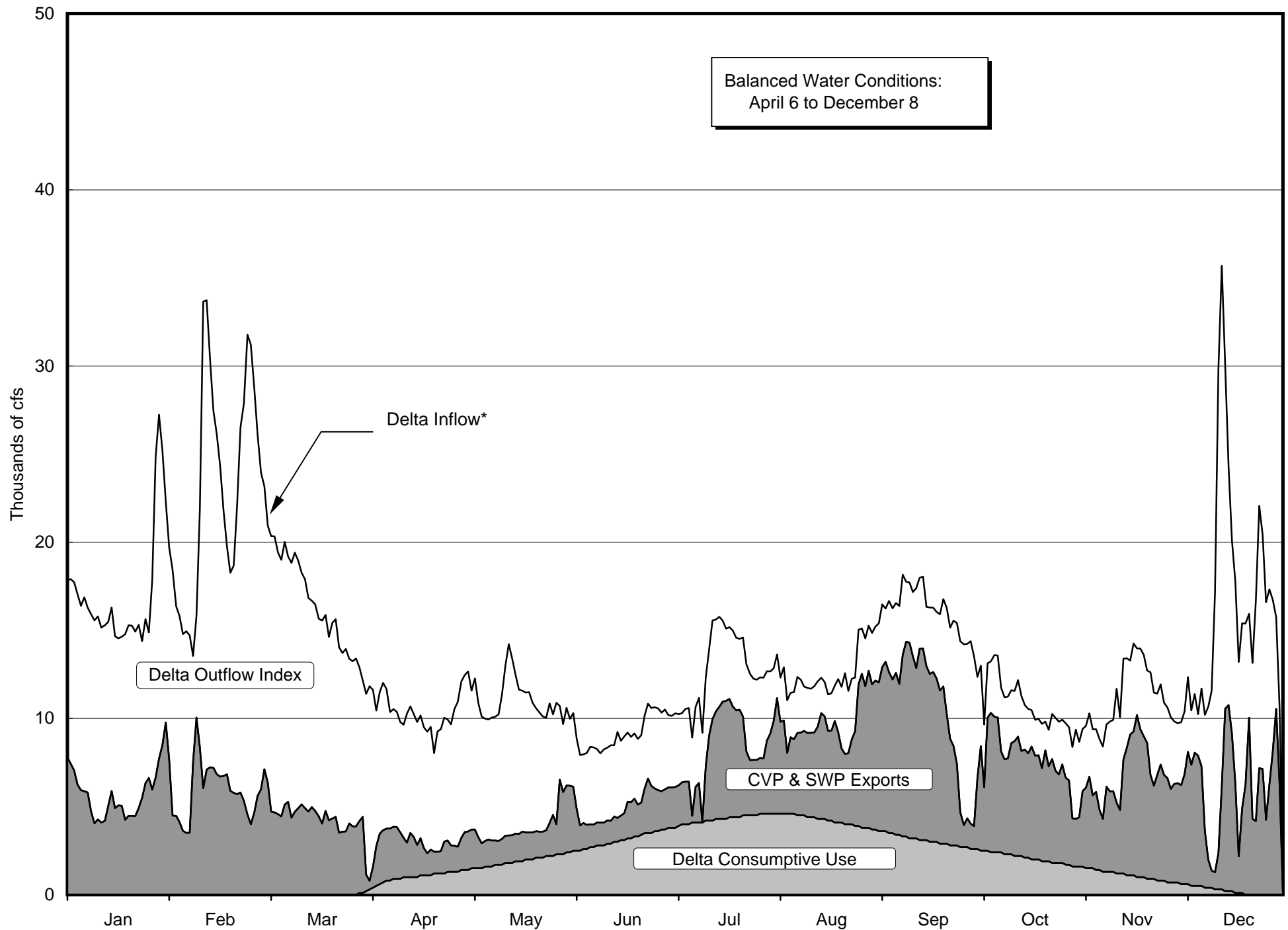
Total: 7,714,804

Note: See Figure 5 for breakdown of SWP Energy Loads.

**Figure 7. DeltaTide, Inflow, and Outflow Index
1994**



**Figure 8. Coordinated Delta Operations
1994**



* Delta Inflow = Exports + Outflow + Consumptive Use.

**Figure 9. Coordinated Delta Operations
Lagged Storage Withdrawals
1994**

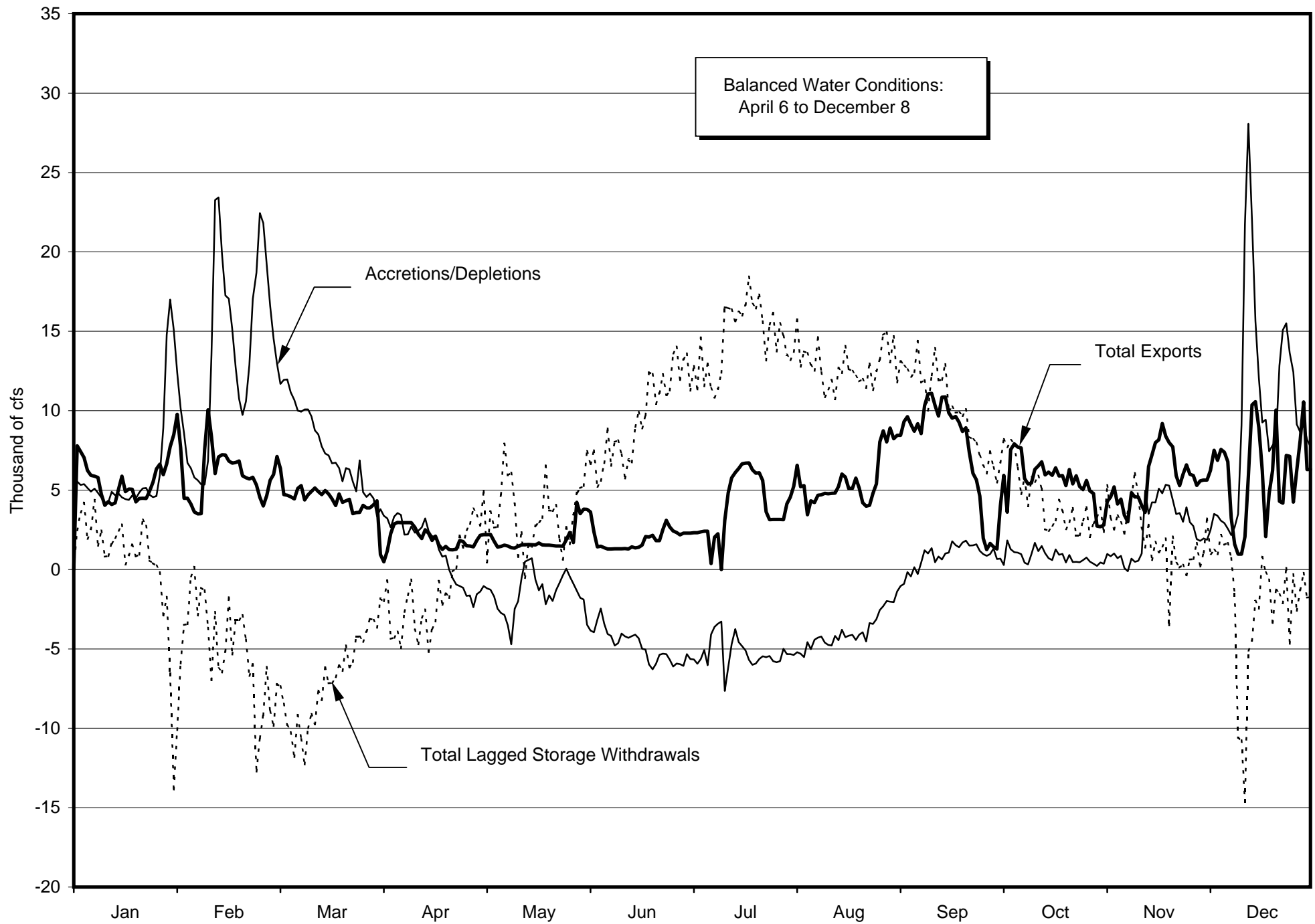


Figure 10. Coordinated Delta Operations
Delta Exports
1994

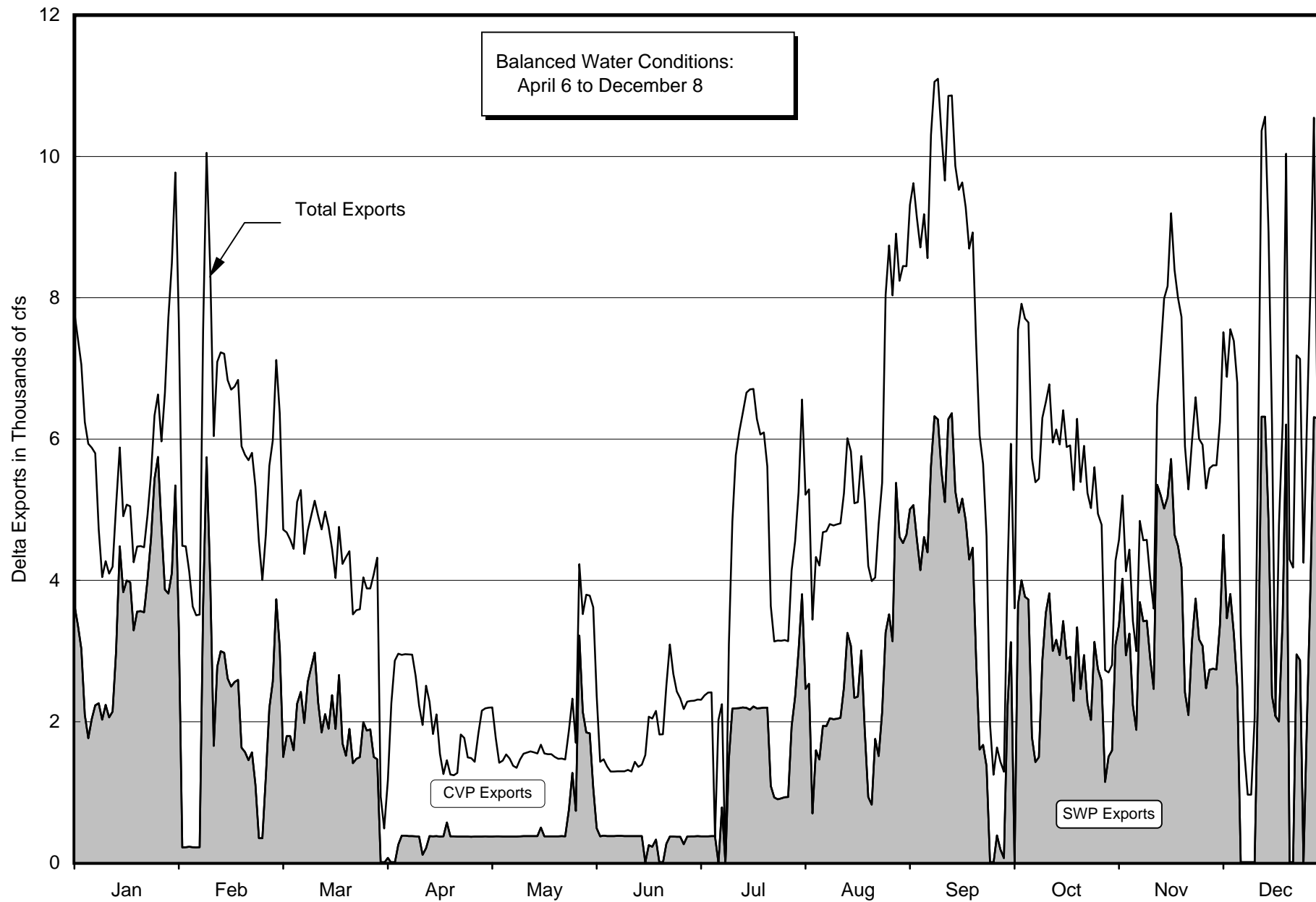


Figure 11. Oroville-Thermalito Complex

Inflow, Releases, and Diversions

1994

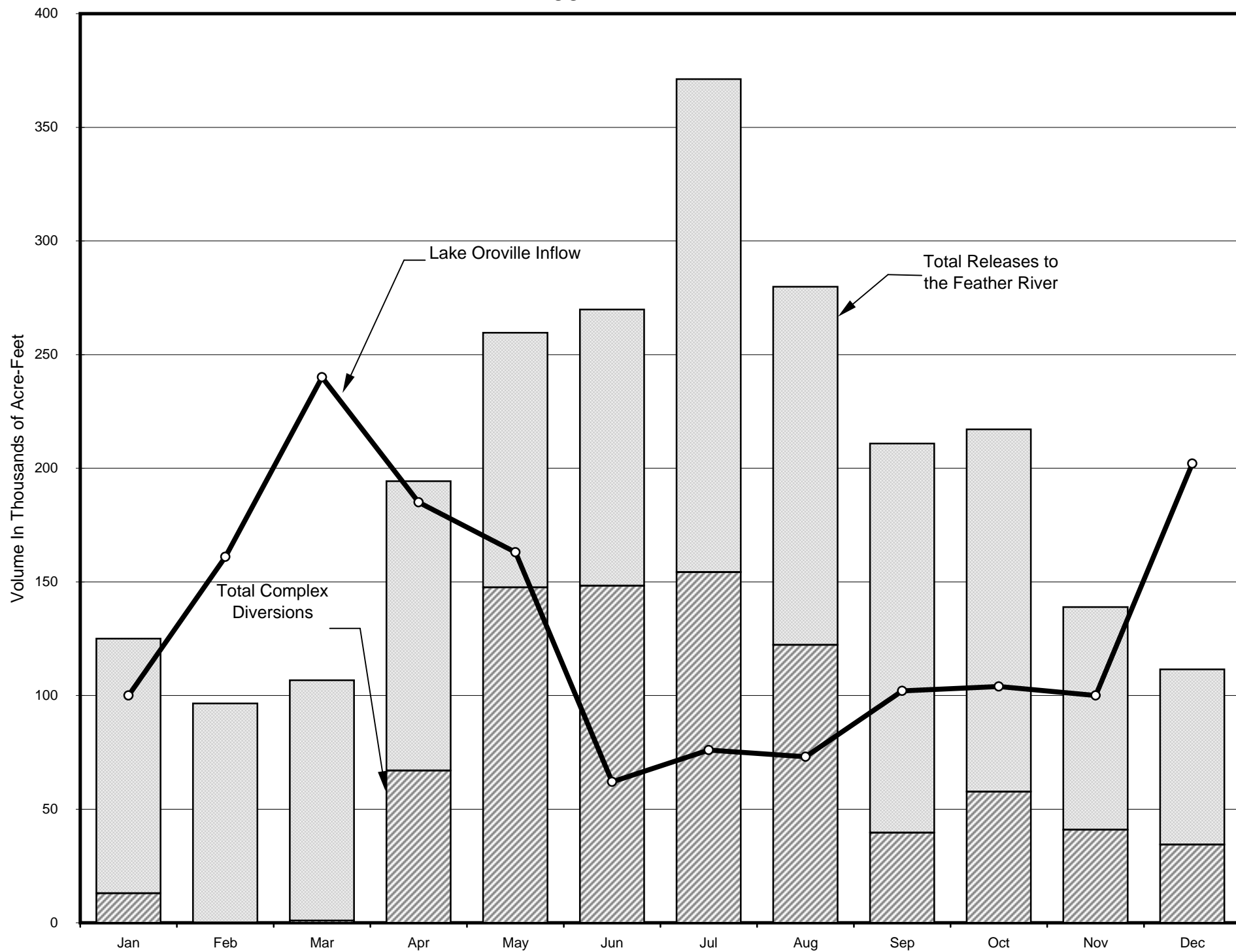
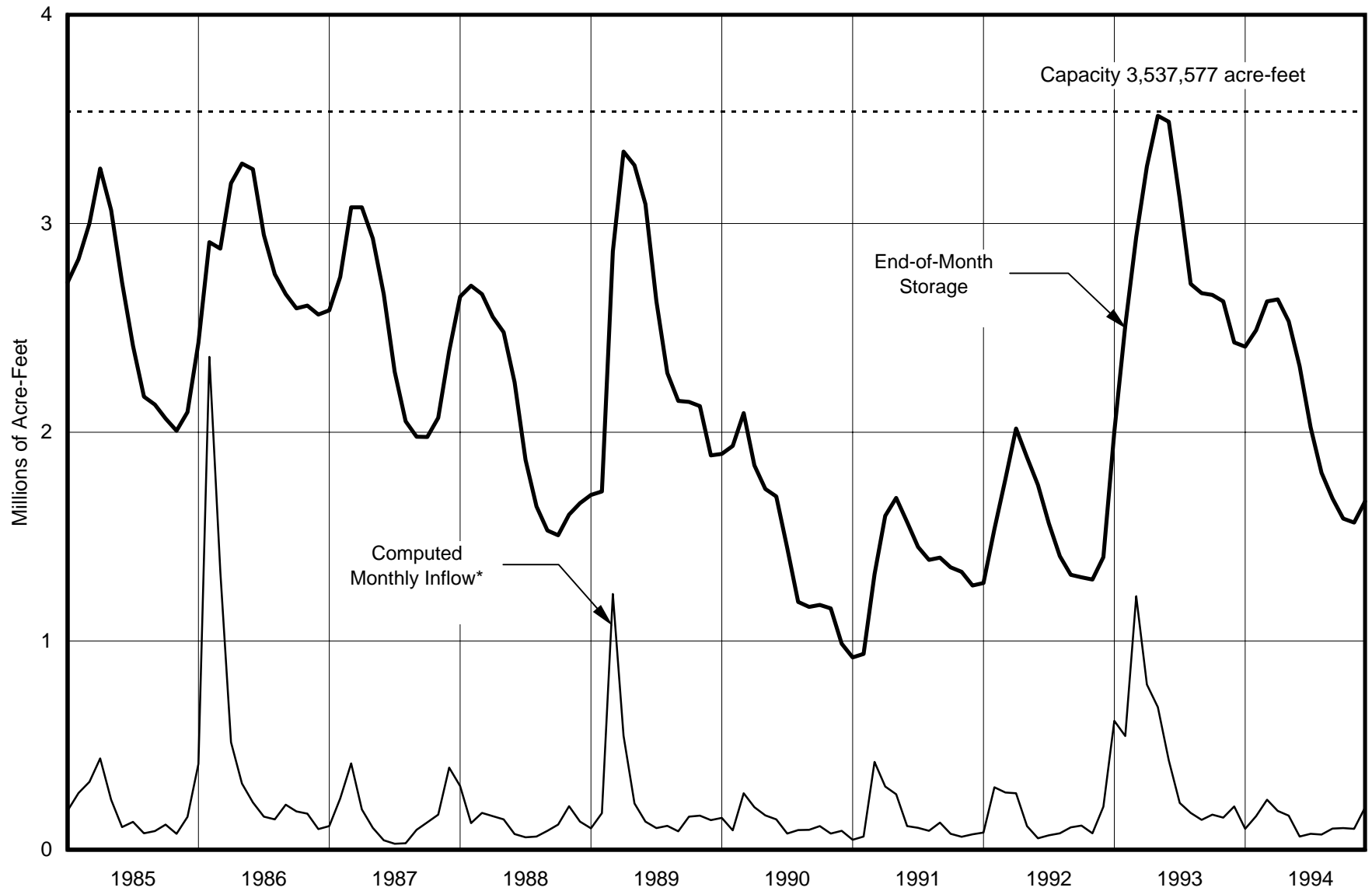


Figure 12. Historical Lake Oroville Operation



* Excludes pumpback.

**Figure 13. Operation of Lake Oroville for Flood Control
1993-94**

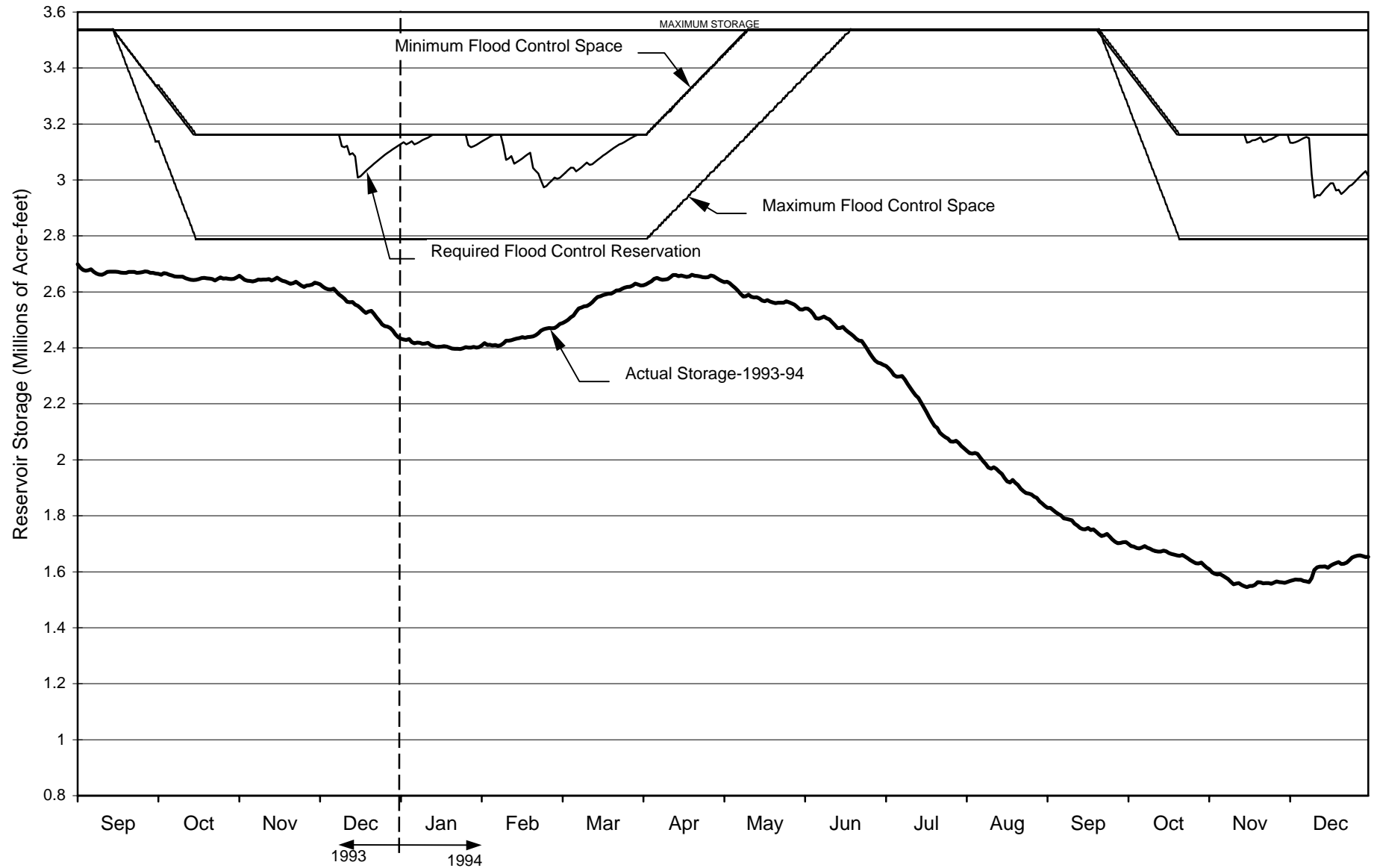
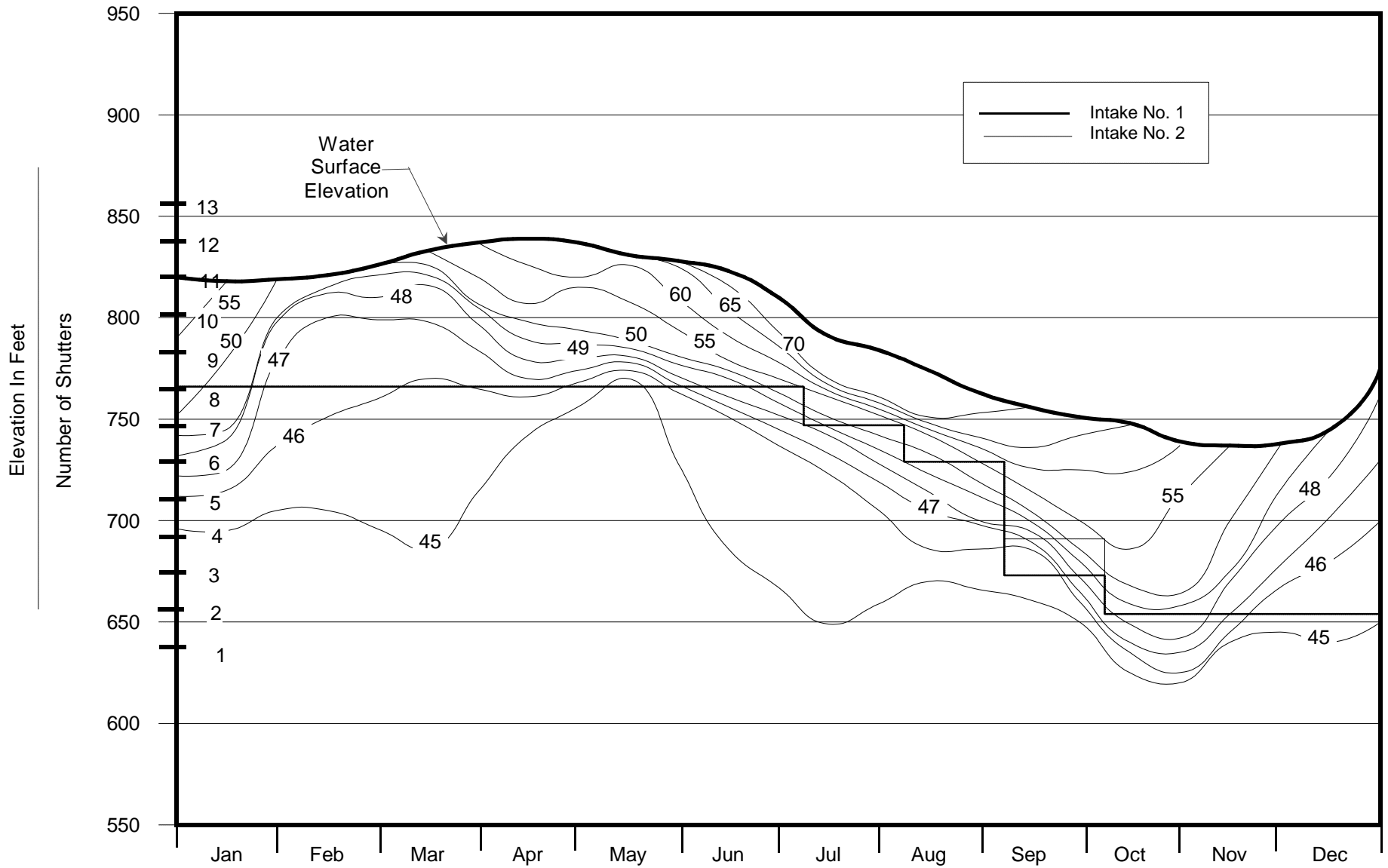


Figure 14. Lake Oroville Temperatures

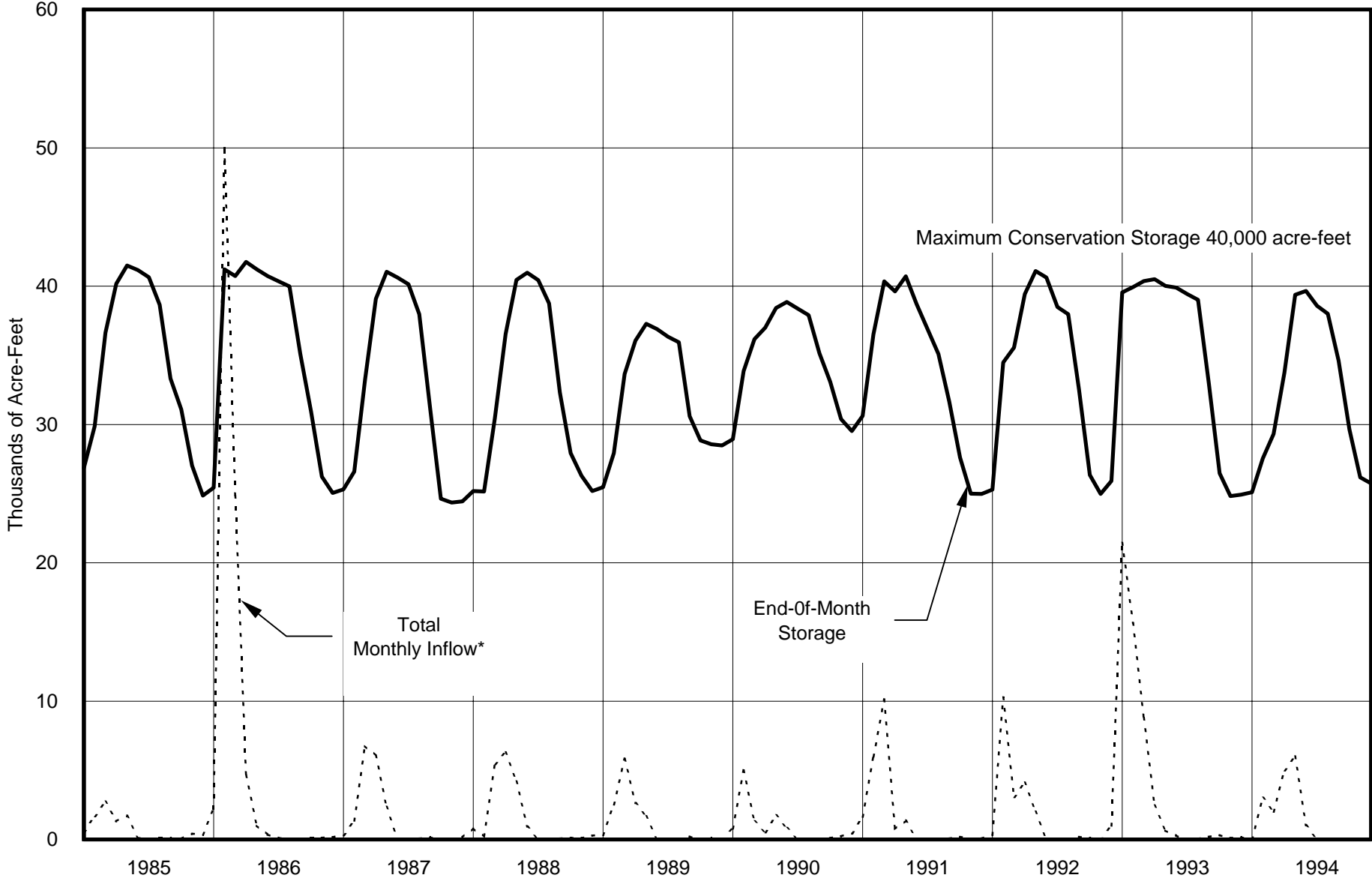
1994

(isotherms in degrees Farenheit)



Note: Temperature data is taken once per month and averaged for the rest of the year.

Figure 15. Historical Lake Del Valle Operation



* Natural and pumped inflows.

Figure 16. Historical San Luis Reservoir Operation

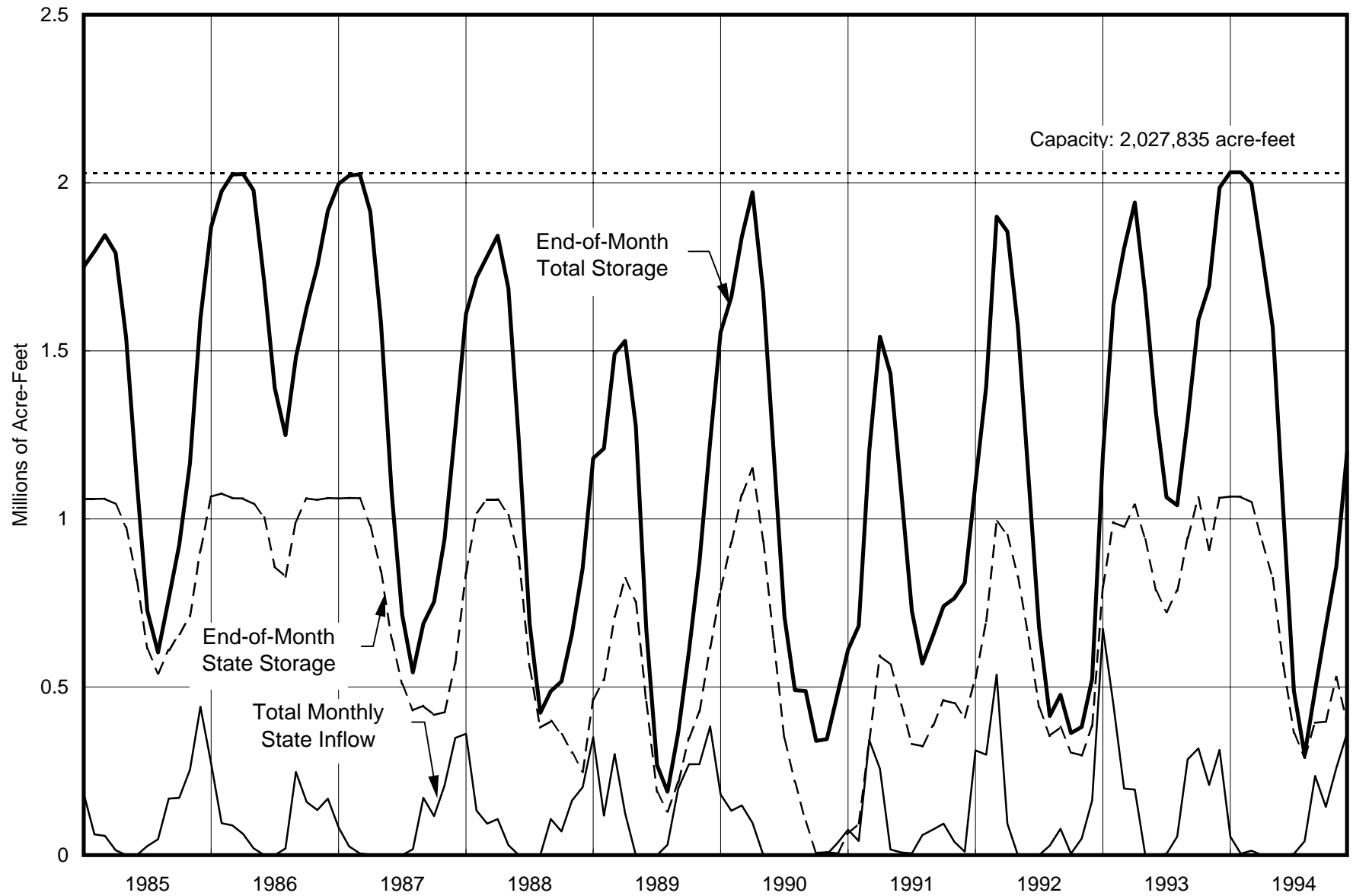
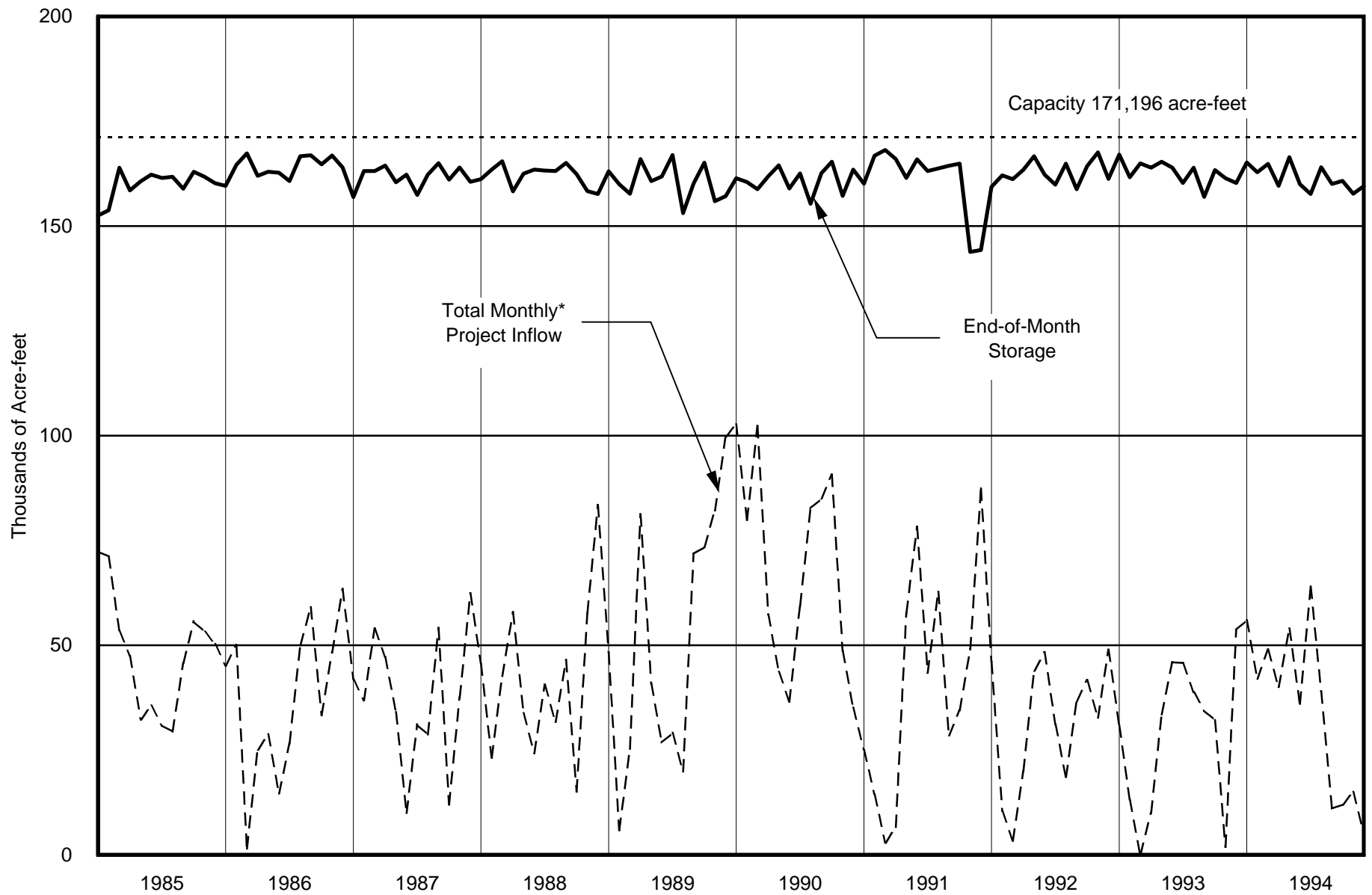


Figure 17. Historical Pyramid Lake Operation



* Excludes pumpback by LADWP through Castaic Powerplant.

Figure 18. Historical Castaic Lake Operation

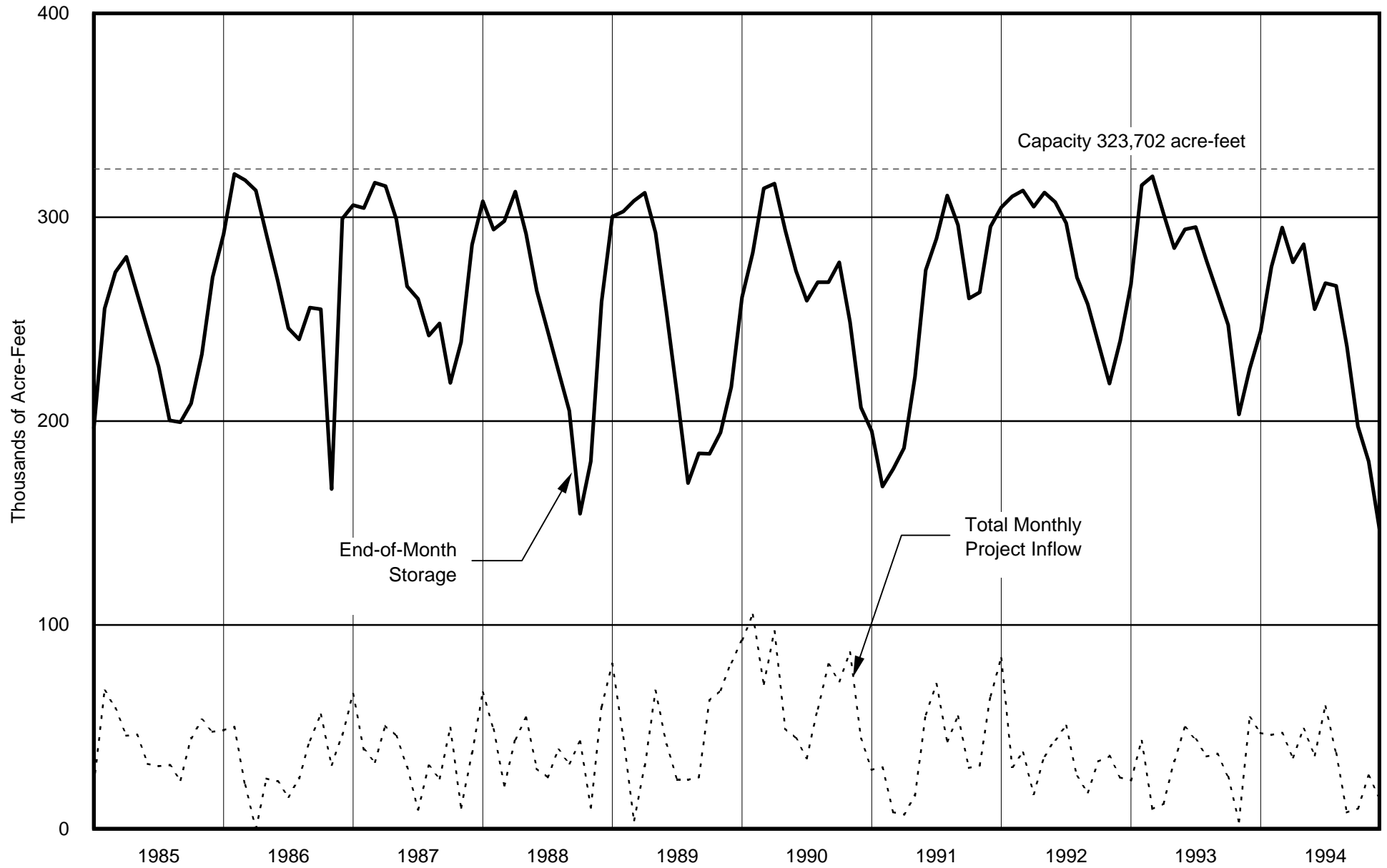


Figure 19. Historical Silverwood Lake Operation

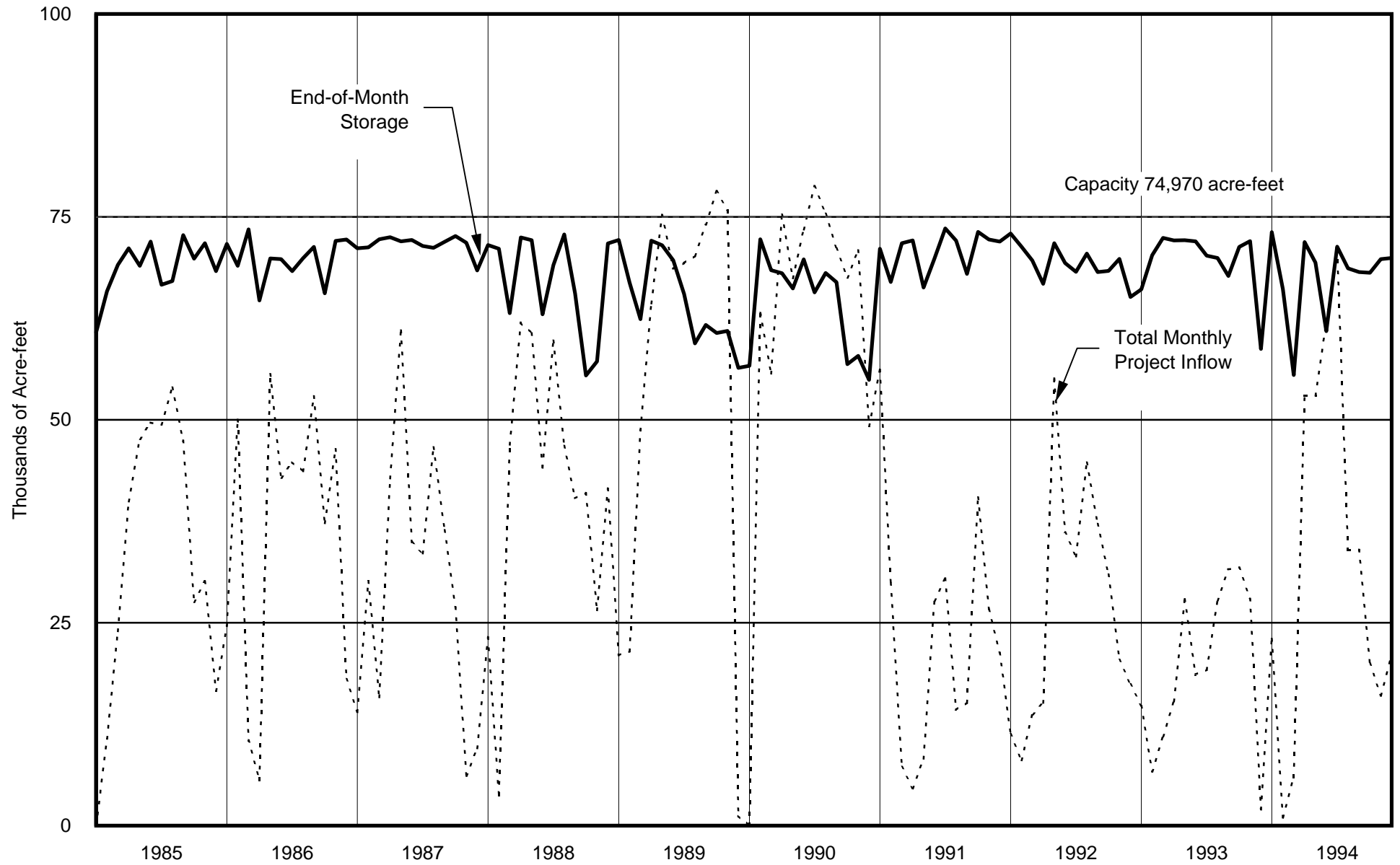
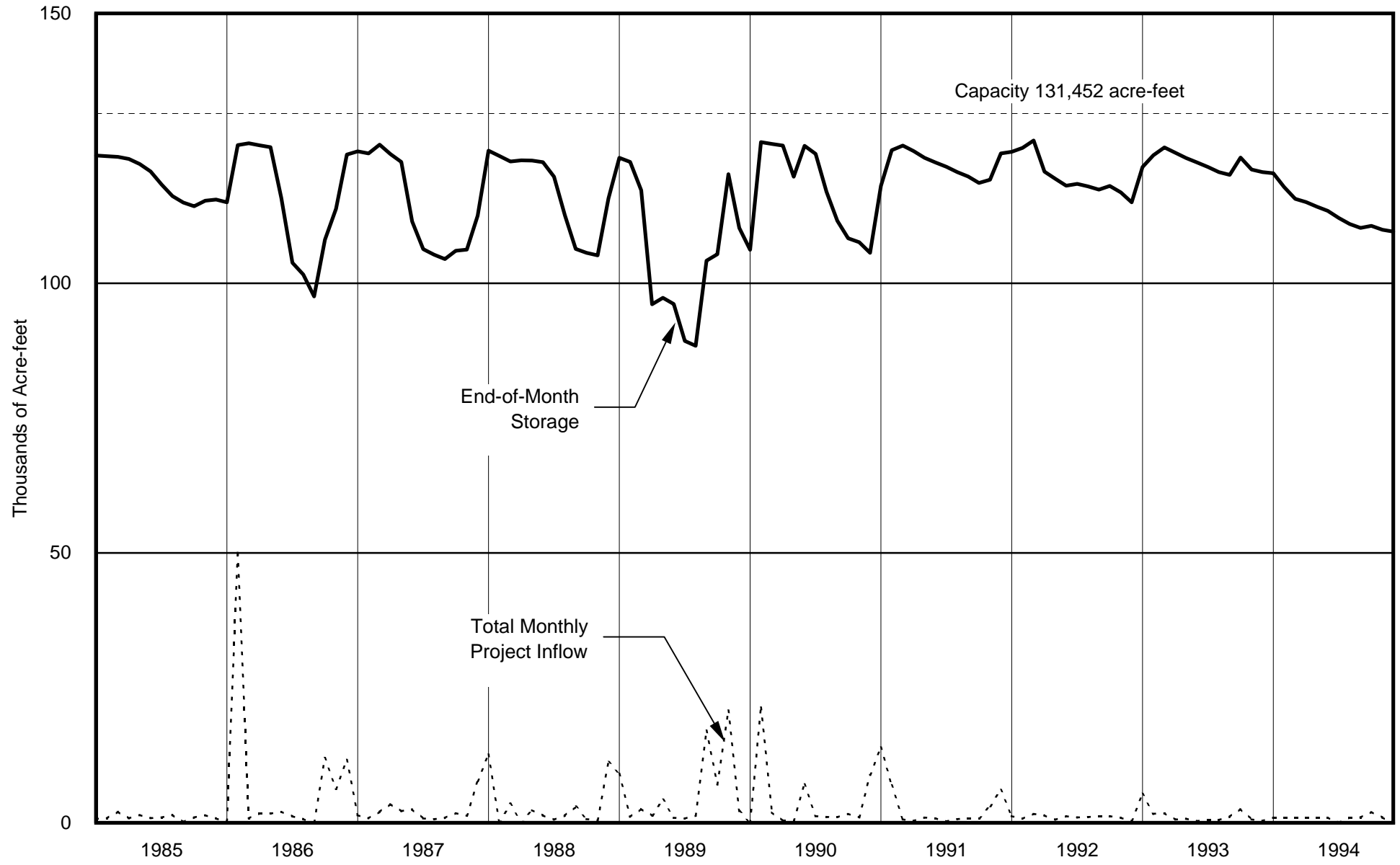
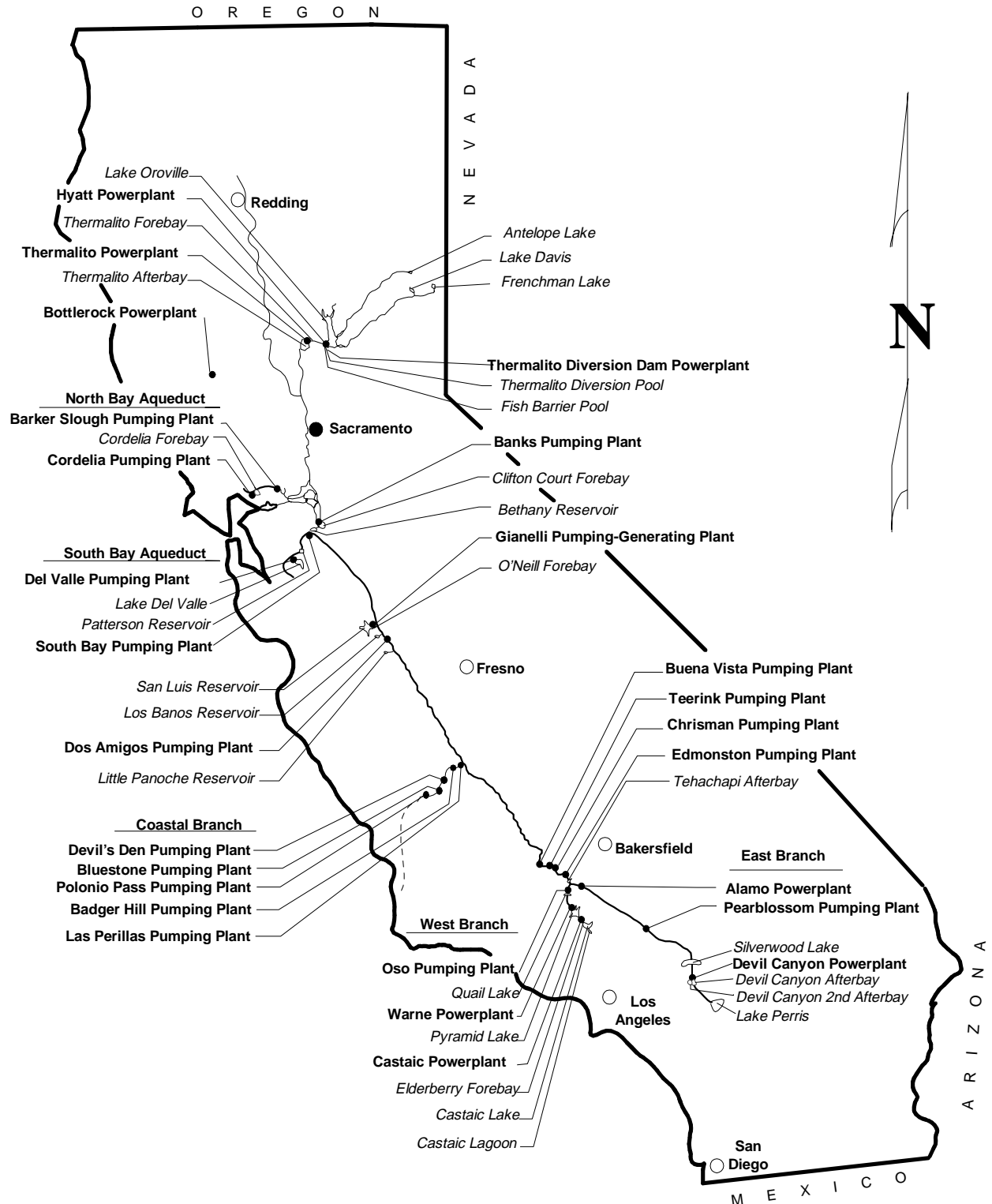


Figure 20. Historical Lake Perris Operation



Map 1

Project Facilities

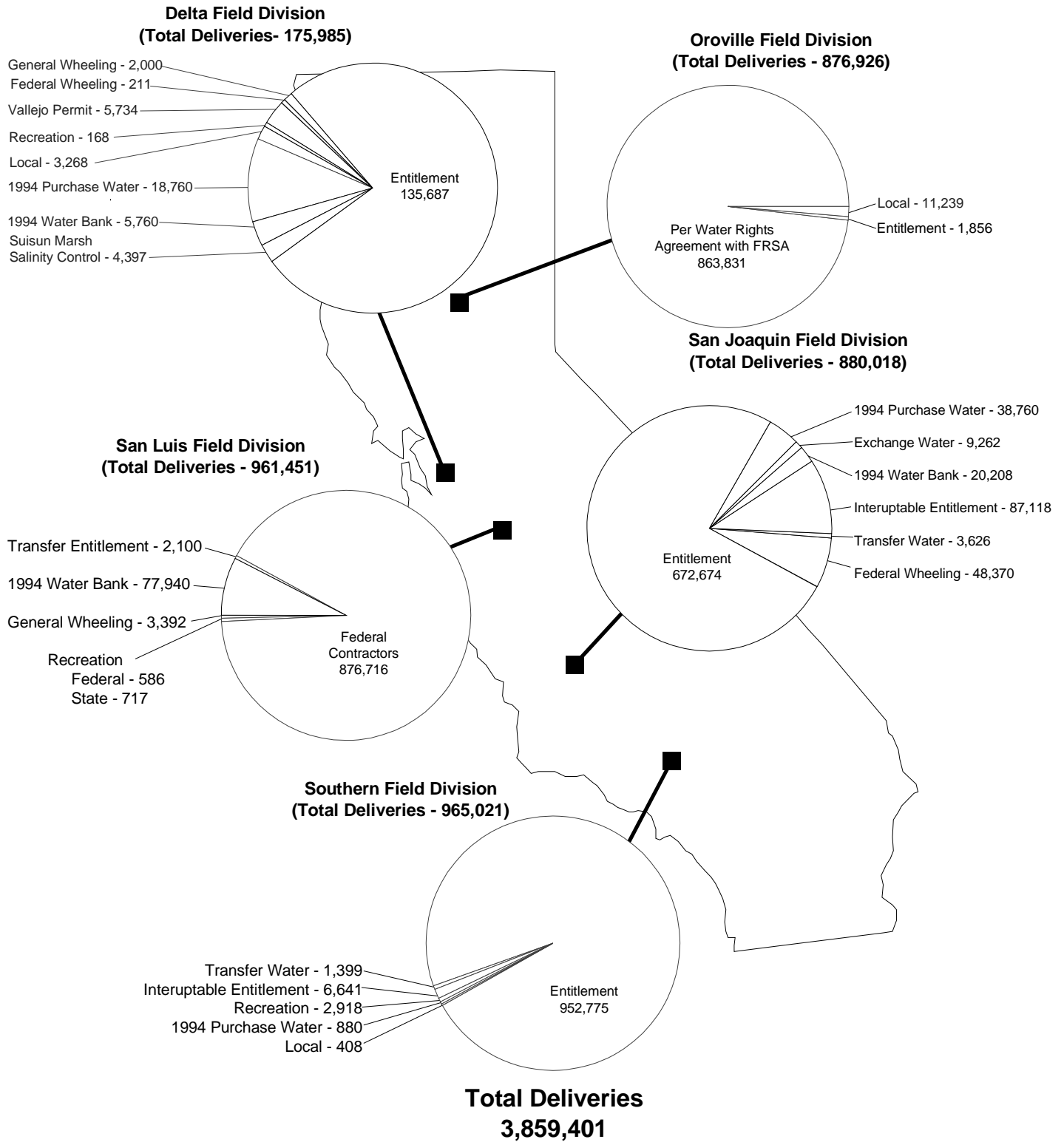


Map 2
Field Division Boundaries



Map 3 1994 Water Deliveries

(in acre-feet)



Glossary

accretion - the water accumulated and retained within a service area.

acre-foot (AF) - a quantity or volume of water covering one acre to a depth of one foot; equal to 43,560 cubic feet or 325,851 gallons.

active storage capacity - the total usable reservoir capacity available for seasonal or cyclic water storage. It is gross reservoir capacity minus inactive storage capacity.

afterbay - a reservoir that regulates fluctuating discharges from a hydroelectric power plant or a pumping plant.

alluvium - a stratified bed of sand, gravel, silt, and clay deposited by flowing water.

aquifer - a geologic formation that stores and transmits water and yields significant quantities of water to wells and springs.

average annual runoff - the average value of annual runoff amounts for a specified area calculated for a selected period of record that represents average hydrologic conditions.

balanced water conditions - exist when upstream reservoir storage releases, plus other inflows, approximately equal the water supply needed to (1) satisfy Sacramento Valley and Sacramento-San Joaquin Delta in-basin needs, including Delta water quality requirements, and (2) meet export needs.

benthic invertebrates - aquatic animals without backbones that dwell on or in the bottom sediments of fresh or salt water. Examples: clams, crayfish, and a wide variety of worms.

biota - all living organisms of a region, as in a stream or other body of water.

brackish water - water containing dissolved minerals in amounts that exceed normally acceptable standards for municipal, domestic, and irrigation uses. Considerably less saline than sea water.

carriage water - the amount of water needed above an increased export so as to not increase salinity in the Delta.

conjunctive use - the operation of a ground water basin in combination with a surface water storage and conveyance system. Water is stored in the ground water basin for later use by intentionally recharging the basin during years of above-average water supply.

Decision 1485 operating criteria - standards for operating water project facilities under Water Rights Decision 1485 regarding the Sacramento-San Joaquin Delta and Suisun Marsh, adopted by the State Water Resources Control Board, August 1978.

Delta consumptive use - the sum of evapotranspiration and changes in soil moisture of Delta lands and evaporation from Delta channels.

Delta outflow index - a calculated approximation of this seaward freshwater outflow as it passes Chipps Island near Pittsburg, beyond the confluence of the Sacramento and San Joaquin Rivers.

depletion - the water consumed within a service area and no longer available as a source of supply.

dissolved organic compounds - carbon substances dissolved in water.

drainage basin - the area of land from which water drains into a river; for example, the Sacramento River Basin, in which all land area drains into the Sacramento River. Also called, "catchment area," "watershed," or "river basin."

drought condition - hydrologic conditions during a defined drought period during which rainfall and runoff are much less than average.

ecology - the study of the interrelationships of living organisms to one another and to their surroundings.

ecosystem - recognizable, relatively homogeneous units, including the organisms they contain, their environment, and all the interactions among them.

effluent - waste water or other liquid, partially or completely treated or in its natural state, flowing from a treatment plant.

environment - the sum of all external influences and conditions affecting the life and development of an organism or ecological community; the total social and cultural conditions.

estuary - the lower course of a river entering the sea influenced by tidal action where the tide meets the river current.

evapotranspiration (ET) - the quantity of water transpired (given off), retained in plant tissues, and evaporated from plant tissues and surrounding soil surfaces. Quantitatively, it is usually expressed in terms of depth of water per unit area during a specified period of time.

evapotranspiration of applied water (ETAW) - the portion of the total evapotranspiration which is provided by irrigation.

forebay - a reservoir or pond situated at the intake of a pumping plant or power plant to stabilize water levels; also a storage basin for regulating water for percolation into ground water basins.

fry - a recently hatched fish.

gross reservoir capacity - the total storage capacity available in a reservoir for all purposes, from the streambed to the normal maximum operating level. Includes dead (or inactive) storage, but excludes surcharge (water temporarily stored above the elevation of the top of the spillway).

ground water - water that occurs beneath the land surface and completely fills all pore spaces of the alluvium, soil or rock formation in which it is situated.

ground water basin - a ground water reservoir, defined by an overlying land surface and the underlying aquifers that contain water stored in the reservoir.

ground water overdraft - the condition of a ground water basin in which the amount of water withdrawn by pumping exceeds the amount of water that recharges the basin over a period of years during which water supply conditions approximate average.

ground water recharge - increases in ground water storage by natural conditions or by human activity.

ground water table - the upper surface of the zone of saturation, except where the surface is formed by an impermeable body.

hydraulic barrier - a barrier developed in the estuary by release of fresh water from upstream reservoirs to prevent intrusion of sea water into the body of fresh water.

hydrologic balance - an accounting of all water inflow to, water outflow from, and changes in water storage within a hydrologic unit over a specified period of time.

hydrologic basin - the complete drainage area upstream from a given point on a stream.

hydrologic region - a study area, consisting of one or more planning subareas.

joint-use facilities - specific pumping plants, power plants, canals, and reservoirs in which both State and federal agencies participated in the construction, use, and maintenance.

land subsidence - the lowering of the natural land surface in response to earth movements; lowering of fluid pressure (or lowering of ground water level); removal of underlying supporting materials by mining or solution of solids, either artificially or from natural causes; compaction caused by wetting (hydrocompaction); oxidation of organic matter in soils; or added load on the land surface.

megawatt - one million watts.

milligrams per liter (mg/L) - the weight in milligrams of any substance dissolved in one liter of liquid; nearly the same as parts per million.

natural flow - the flow past a specified point on a natural stream that is unaffected by stream diversion, storage, import, export, return flow, or change in use caused by modification in land use.

percolation - the downward movement of water throughout the soil or alluvium to a ground water table.

permeability - the capability of soil or other geologic formations to transmit water.

phytoplankton - minute plants, usually algae, that live suspended in bodies of water and that drift about because they cannot move by themselves or because they are too small or too weak to swim effectively against a current.

pollution (of water) - the alteration of the physical, chemical, or biological properties of water by the introduction of any substance into water that adversely affects any beneficial use of water.

prior water right - a water designation used for water delivered based on its use prior to SWP construction.

pumping-generating plant - a plant at which the turbine-driven generators can also be used as motor-driven pumps.

recharge basin - a surface facility, often a large pond, used to increase the percolation of surface water into a ground water basin.

riparian vegetation - vegetation growing on the banks of a stream or other body of water.

runoff - the total volume of surface flow from an area during a specified time.

Sacramento River index - the sum of the Sacramento Valley's unimpaired runoff at the following four locations: Sacramento River near Red Bluff; total Feather River inflow to Lake Oroville; Yuba River at Smartville; and total American River inflow to Folsom Lake.

salinity - generally, the concentration of mineral salts dissolved in water. Salinity may be measured by weight (total dissolved solids), electrical conductivity, or osmotic pressure. See **total dissolved solids**.

salinity intrusion - the movement of salt water into a body of fresh water. It can occur in either surface water or ground water bodies.

salt-water barrier - a physical facility or method of operation designed to prevent the intrusion of salt water into a body of fresh water.

sediment - soil or mineral material transported by water and deposited in streams or other bodies of water.

seepage - the gradual movement of a fluid into, through, or from a porous medium.

service area - the geographical land area served by a distribution system of a water agency.

snow water content - a calculated or measured amount of water contained in packed snow based on its depth and density.

spawning - the depositing and fertilizing of eggs (roe) by fish and other aquatic life.

streamflow - the rate of water flow past a specified point in a channel.

surplus water - developed water supplies in excess of contract entitlement or apportioned water.

total dissolved solids (TDS) - a quantitative measure of the residual minerals dissolved in water that remain after evaporation of a solution. Usually expressed in milligrams per liter. See **salinity**.

transpiration - an essential physiological process in which plant tissues give off water vapor to the atmosphere.

unimpaired runoff - represents the natural water production of a river basin, unaltered by upstream diversions, storage, or by export or import of water to or from other watersheds.

waste water - the water, liquid waste, or drainage from a community, industry, or institution.

water conservation - reduction in applied water due to more efficient water use.

water quality - used to describe the chemical, physical, and biological characteristics of water, usually in regard to its suitability for a particular purpose or use.

water right - a legally protected right to take possession of water occurring in a natural waterway and to divert that water for beneficial use.

water table - see **ground water table**.

water year - a continuous 12-month period for which hydrologic records are compiled and summarized. In California, it begins on October 1 and ends September 30 of the following year.

watershed - see **drainage basin**.